NETWORK WORLD
The Newsweekly of User Networking Strategies

Solving Windows Network Problems
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Cabletron adds muscle to LAN hub

By Maureen Molloy
Staff Writer

BOSTON — Cabletron Systems, Inc. this week is expected to bolster its Multi Media Access Center (MMAC) by adding advanced features and functions usually found only in emerging third-generation LAN hubs.

Cabletron will unveil at NetWorld 92 Boston five new MMAC modules that will significantly enhance the performance, reliability and network management capabilities of the local-area network hub.

Although Cabletron will offer third generation-like capabilities, the enhancements will fall short of making MMAC a true third-generation hub. Other vendors, such as Bytex Corp., Hughes LAN Systems, Inc., SynOptics Communications, Inc. and 3Com Corp., have unveiled or discussed plans for third-generation hubs.

According to Jeff Churchill, a field support engineer for Cabletron, the company is introducing four new repeater media interface modules (MIM) for connecting devices to the hub and an integrated multiport bridging/network management module.

The TPRMIM-33 and TPRMIM-36 are 10Base-T modules with 12

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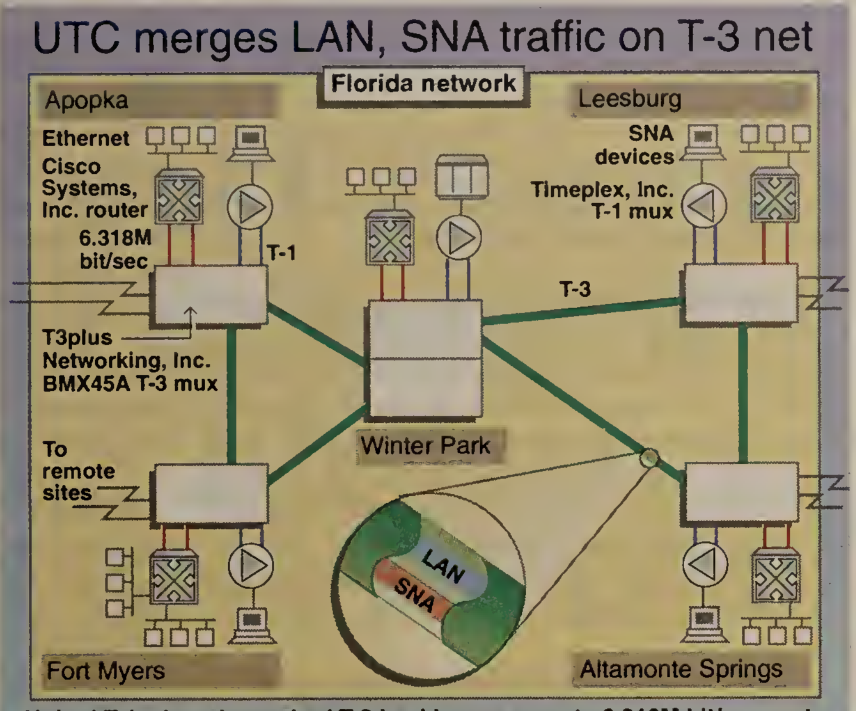
UTC merges LAN, SNA traffic on T-3 net



United Telephone's meshed T-3 backbone supports 6.318M bit/sec router connections for multiprotocol LAN traffic as well as separate T-1 speed channels for SNA data.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: UNITED TELEPHONE COMPANY OF FLORIDA, INC., WINTER PARK, FLA.

T-3 backbone gives utility the best of two net worlds

By Paul Desmond
Senior Editor

WINTER PARK, Fla. — To link bandwidth-hungry LANs springing up all over the state, United Telephone Company of Florida, Inc. has built a meshed T-3 network that supports multiprotocol internetwork traffic as well as SNA data.

Today, United Telephone concentrates multiprotocol local-area network traffic on 6.318M bit/sec channels on its data-only T-3 net, which supports separate T-1 channels for Systems Network Architecture traffic. SNA is used to link cluster controllers at sites around the state to a front-end processor at the company's data center here.

But United Telephone is rolling out new token ring-attached remote IBM front-end processors that will enable SNA and LAN traffic to share the same channels on the T-3 pipes. That promises to reduce response time and circuit costs while increasing reliability.

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Users hail debut of Novell mgmt. system

NetWare Management System lets users control LANs across an enterprise from a single console.

By Caryn Gillooly
Senior Editor

PROVO, Utah — Novell, Inc. last week released its NetWare Management System (NMS) to the applause of users and analysts, who labeled the product a significant advance in centralized control of local-area networks.

More than 50 vendors pledge support for NMS. Page 75.

NMS, which Novell has dropped hints about for more than a year, will let LAN administrators manage NetWare LANs and attached devices spread throughout an enterprise from a single management console ("Details leaked on NetWare tools for enterprise mgmt.," *NW*, Jan. 27).

"We're very excited about the potential of this," said Paul Bandrowski, senior advanced technical analyst at Sara Lee Corp., a large Novell user in Chicago.

"There is no other type of product out there that does this," he added. "There is a hodgepodge of products that allow us to manage nets, but this hodgepodge doesn't lend itself to easily locating and fixing problems."

There are three primary pieces to NMS: the NetWare Management Agent, software that collects information from various devices to be managed; the NetWare Services Manager, a central console application that compiles the data gathered by the agents and lets the administrator

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NETLINE

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AT&T AWAITS FCC NOD for enhanced 800 services. Page 4.

IBM LICENSES TOKEN-RING chip to National Semiconductor to spur market growth. Page 4.

DEC TO REVEAL PLANS for tighter Pathworks, NetWare integration. Page 4.

AT&T OFFERS MIDSIZE users Optimum outbound long-distance service with guarantees. Page 4.

UNISYS ADDS PU 2.1 NODE support to DCP via software upgrade. Page 5.

LEGENT UNLEASHES software to centrally monitor token-ring LANs. Page 5.

DATAPOINT PUMPS UP Arcnet to 20M bit/sec. Page 6.

NEWSPAPER

FEATURE

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SNA and LAN internets: a long walk to the altar

By Anura Guruge
Special to Network World

It would have been difficult to believe a few years ago, but the future of IBM's Systems Network Architecture and LAN internetworks are now symbiotically intertwined, a fact that is galling to the open systems vanguard.

SNA's capitulation to more open protocols, such as the TCP/IP or Open Systems Interconnection, has long been a key element in the game plan of open systems supporters. But, with SNA and internets converging, that surrender is not likely to occur any time soon.

This is the reason why users, vendors and analysts confidently as well as unerringly mention SNA and inter-

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NETWORK SECURITY TEST SERIES

NCSA casts the spotlight on scanners

By Salvatore Salamone
Features Writer

With the threat of viruses growing almost daily, it pays to invest in a good virus scanner software package. Scanners detect viruses before they can spread by searching for them in idle applications.

In this test, the latest conducted by the National Computer Security Association (NCSA) in *Network World's* Network Security Test Series, the NCSA evaluated 19 virus scanner packages for IBM-compatible personal computers.

The test identified a selec-

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Mix of quality standards leaves telcos vulnerable

Congressional report shows range of standards for service quality, installation intervals and repairs.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Because local and long-distance carriers have implemented a patchwork quilt of internal service quality standards, it is virtually impossible to guarantee network reliabilty in the U.S.

That was the conclusion reached last week by the U.S. House Subcommittee on Telecommunications and Finance after reviewing data on network quality standards submitted by the regional Bell holding companies, GTE Telephone Co., United Telecommunications, Inc. and the Big Three carriers.

In a 100-page report, the subcommittee showed that the carriers had widely divergent standards for service quality, installation intervals and repairs. For example, the repair time for a downed T-1 circuit ranged from a low of one hour to a full day.

Lawmakers voiced concern that maintaining a carrier-driven approach to quality assurance and allowing carriers to maintain widely differing reliability and maintenance standards is a threat to public network safety.

"Identification of points of vulnerability, standardized maintenance procedures, adequate hardware and software testing are crucial to network relability

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Year-old IBM-Novell deal outperforming expectations

Companies close ranks on product development.

By Bob Brown
Senior Editor

BOSTON — Usually, mixing the colors blue and red yields purple. But IBM and Novell, Inc. have generated a fair amount of green from their year-long relationship, under which IBM is selling NetWare in Big Blue boxes.

IBM and Novell's blockbuster product licensing, distribution and support deal, unveiled at NetWorld 91 Boston, has exceeded the expectations of both vendors ("IBM, Novell finalize NetWare resale deal," *NW,* Feb. 18, 1991).

Users also seem satisfied with the relationship, noting that it has brought IBM and Novell closer together on product development efforts.

A year ago, many users were concerned that Novell could lose its identity by teaming with IBM. In addition, users expressed concern about IBM's commitment to LAN Server ("Users wary of IBM pact to resell NetWare," *NW,* Feb. 18, 1991).

"IBM's LAN strategy is still confusing," said Chuck Rush, systems project manager at McDonald's Corp. in Oak Brook, Ill.

"But the combined forces of IBM and Novell has resulted in Novell doing more development" to support IBM technologies, such as AIX, OS/2 and Systems

(continued on page 77)

API to let applications use mix of E-mail transports

By Timothy O'Brien
West Coast Bureau Chief

REDWOOD CITY, Calif. — Apple Computer, Inc., Borland International, Inc., Lotus Development Corp. and Novell, Inc. last week announced an agreement to jointly develop a common program interface to messaging applications.

The four companies are hoping that the new Vendor-Independent Messaging (VIM) Interface, based on Lotus' Open Messaging Interface (OMI) specification proposed last fall, will accelerate development of applications that can communicate using different electronic mail systems.

"Our goal is take advantage of the mail transport to enhance existing products and build a new class of applications," said Richard Schwartz, senior vice-president and chief technical officer at Borland. "Vendor-independent messaging, that says it all."

The VIM application program interface (API) will simplify the task of adding messaging functions to applications such as word processors and spreadsheets, and speed creation of work group applications that use E-mail to forward messages between users or

(continued on page 75)

Briefs

Transitional outsourcing. Revlon, Inc. this week is expected to announce a short-term outsourcing contract with Andersen Consulting that will enable the cosmetics firm to migrate from a centralized IBM mainframe to a distributed computing environment based on Hewlett-Packard Co. minicomputers. Under the two-year, $9 million deal, Andersen Consulting will manage the firm's data processing and network operations as well as perform applications maintenance.

Industry observers are calling the short-term contract a transitional outsourcing deal because Revlon intends to resume control over its network operations within a short period of time.

3Com to address hub security. 3Com Corp. tomorrow will make an announcement regarding new security features for its wiring hubs at NetWorld 92 Boston, according to Eric Benhamou, 3Com's president and chief executive officer. The security features will be implemented on 3Com's newly acquired line of wiring hubs from BICC Group plc's data networking business and the rest of 3Com's wiring hub product line, he said. Further details were not available.

Court rules AT&T infringed on patent. A federal court jury last week ordered AT&T to pay little-known Collins Licensing L.P. $34.6 million after the jury found that AT&T's 5ESS switch infringes on a patent Collins Licensing holds for a Time Space Time Switch. AT&T plans to appeal the ruling and believes the patent will be found invalid by the U.S. Patent Office, which is reviewing it, an AT&T spokesman said.

Separately, AT&T said it plans to transfer or dismiss as many as 2,000 managers at its Network Systems division, the unit responsible for making switching and transmission equipment. AT&T plans to make the changes within three months and will notify those managers being affected by March 1, the company spokesman said.

DEC to resell LAN Manager. Digital Equipment Corp. and Microsoft Corp. are expected to announce tomorrow at NetWorld 92 Boston an agreement that calls for DEC to resell Microsoft's networking products, according to sources close to both companies. While DEC already offers its Pathworks network operating system — based in part on Microsoft's LAN Manager — the new agreement would allow DEC to market Microsoft's versions of LAN Manager and Windows. DEC and Microsoft are also expected to announce plans to offer a version of Microsoft's Windows NT operating system for DEC's Alpha, a Reduced Instruction Set Computer version of a VAX microprocessor.

Northern Tel, Motorola to team up. Northern Telecom, Inc. and Motorola, Inc. are expected to announce a pact today to jointly build and market advanced switching systems to deliver mobile calling services. While sources close to the project confirmed the announcement, Northern Telecom declined to comment on the planned announcement. The two firms are expected to create a new division or a jointly owned company to build and market the communications systems.

AT&T to expand with fiber. AT&T last week announced plans to team with other carriers to lay new fiber-optic cables in the Caribbean and Asia. This fall, AT&T, Cable & Wireless PLC, Telefonica Larga Distancia de Puerto Rico and US Sprint Communications Co. expect to commence service on the Taino-Carib fiber cable. Taino-Carib — to comprise six fiber-optic pairs, each running at 560M bit/sec — will link Puerto Rico, St. Thomas and Tortola. In 1995, AT&T, Data Communications Corp. of Korea, the Korean Telecommunications Authority and Kokusai Denshin Denwa Company, Ltd. expect to commence service on a fiber cable linking Guam, Japan and South Korea. The cable contains two fiber pairs running at 560M bit/sec. It will be linked to the Trans-Pacific Cable-5, which, in 1995, is scheduled to link Guam, Hawaii and Japan to the U.S. mainland.

DEC, Cisco huddle on router module. Digital Equipment Corp. is reportedly negotiating with Cisco Systems, Inc. for the router maker to develop a routing module for the DEChub 90 Ethernet chassis. The low-end DEChub 90 houses any mix of as many as eight terminal server, bridge or repeater modules for work groups in small to midsize companies. DEC and Cisco declined to comment.

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AT&T intros long-distance package for midsize users

Consolidated billing, volume discounts included.

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T last week announced a new outbound long-distance service package called Optimum targeted at midsize users that spend between $4,500 and $30,000 per month on service.

Optimum offers features that AT&T had previously made available only to large business customers, including consolidated billing as well as volume discounts based on spending by multiple locations. The carrier will offer credits or money-back guarantees if it fails to meet Optimum's provisioning and trouble resolution intervals.

"In the past, AT&T marketed its mid-range services solely on price," said Mark Langner, an associate with TeleChoice, Inc., a Montclair, N.J., consultancy. "With Optimum, AT&T's moving its focus away from price to customer service and support."

According to analysts, Pro WATS customers as well as companies that use Megacom, which covers almost the same spending range, are likely to move to Optimum.

> "With Optimum, AT&T's moving its focus away from price to customer service."
>
> ▲▲▲

Optimum is available under a flat rate or with banded pricing. With flat-rate pricing, calls made during the peak hours of 8 a.m. to 5 p.m. weekdays cost 18.4 cents per minute when dedicated access facilities are used and 24 cents per minute when switched access is used.

With the three-tiered banded pricing, calls made during peak hours to sites up to 292 miles away cost 17.4 cents per minute when using dedicated access and 23 cents per minute with switched access; calls to sites 293 to 925 miles away cost 18.4 cents per minute with dedicated access and 24 cents per minute with switched access; and calls to sites from 926 to 5,700 miles away cost 19.4 cents a minute with dedicated facilities and 25 cents a minute with switched access.

Rates for calls to 180 countries served by AT&T are tariffed on a per-country basis.

Optimum carries a onetime $50 account-setup charge and a onetime per-location charge of $10 for each switched access site and $545 for each dedicated access site. The service has a $100 monthly account charge per site, which is waived when the number of sites exceeds 50; a $5 monthly location charge for each switched

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Carrier seeks FCC go-ahead on enhanced 800 service

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T is awaiting regulatory approval to begin offering enhanced 800 services, which will be installed and repaired more quickly than current offerings and will come with money-back guarantees to cover outages.

But in exchange for the added reliability, the carrier will charge far more for the offerings than it does for existing services. The offerings are new versions of its 800 services, ranging from the baseline Readyline 800 to Megacom 800, AT&T's flagship service for call centers.

The offerings include: Readyline 800 Plus Service, 800 Masterline Plus Service, Basic 800 Plus Service and Megacom 800 Plus Service. These services will become available March 7 if they receive approval from the Federal Communications Commission.

"We think the services will be particularly attractive for users with mission-critical 800 applications," said Cedric Smith, a district manager with AT&T's product marketing group.

"These new service and support features push AT&T further ahead of MCI and Sprint, although I don't expect either to wait too long to come out with the same capabilities," said Bob Self, president of Market Dynamics, a New York consultancy. "A year from now, all these new optional features may become standard and a new set of capabilities may take their place."

But the added service and support is not free.

AT&T Plus services' usage rates are on average 7% higher than those of its existing 800 offerings. Also, monthly service charges for Plus are at least 50% higher than those of today's AT&T toll-free services.

AT&T said the new services will be installed in half the time it takes to install other 800 services. Megacom 800 Plus can be installed in 15 days, Basic 800 Plus and 800 Masterline Plus can be brought up in 10 days, and Readyline 800 Plus can be installed in one hour, Smith said.

According to AT&T, it will guarantee to resolve problems with 800 Plus services in five hours or less, compared to eight hours for other 800 services.

The services are supported by equipment using the extended superframe format, which provides enhanced performance monitoring of the T-1 lines used to access Plus services. If performance falls below preestablished levels set by the customer, the carrier will either contact the user or begin working on the problem itself, Smith said. AT&T said expert systems will help it solve Plus service problems.

If AT&T does not meet its repair intervals, it will give Plus users a maximum of 5% credit off monthly usage fees.

The carrier also said it has strengthened its 800 Service Assurance Policy by reducing from 30 minutes to 15 minutes the amount of time required to invoke one of several rerouting options for the Plus services.

If a Plus customer's service is partially or totally interrupted, the carrier will implement a backup routing option that is selected by the customer in advance. AT&T can reroute calls to another 800 number, install a temporary 800 service or have calls routed to a recorded announcement that informs callers of the temporary interruption and refers them to another number.

AT&T said it will meet an overall 99.9% call completion rate for Plus call attempts on the carrier's worldwide network. Plus users will be issued a 5% credit toward the monthly service fee on their next bill if the rate falls below that level.

According to AT&T, it will give Plus customers priority over all other customers in the event of network congestion or failure. Also, the carrier will give Plus customers consolidated billing, enabling them to receive charges for their Plus and other 800 or WATS services on a single bill.

In addition, AT&T will provide Plus customers with a personal computer-based package called AT&T Detail Manager, which will allow them to identify calling trends and monitor costs. The carrier will also assign a dedicated billing representative to each Plus customer.

Subscribers will receive a monthly report with information on installation, maintenance, repair and network call completion for Plus services.

IBM licenses token-ring chip to Nat'l Semiconductor

By Bob Brown
Senior Editor

WHITE PLAINS, N.Y. — IBM last week announced it has licensed its Token-Ring chip technology to National Semiconductor Corp., the leading supplier of Ethernet chipsets, in a move to spur the growth of the token-ring market and improve product interoperability.

The agreement could be a boon for users if it encourages new vendors to enter the token-ring market with products that interoperate with current offerings. Increased competition in the chip market could also drive down prices of token-ring chips and products based on them.

Chip licensing is the first step in a broader arrangement under which IBM and National will work to integrate token ring and Ethernet.

"Together, we are seeking to address customer requirements like mixed token-ring and Ethernet nets, network-ready PCs and improved LAN performance at reduced costs," said John McElroy, IBM's local-area network product manager.

Among other things, IBM and National will explore putting Ethernet and token-ring chips on the same personal computer motherboard, said Charles Carinalli, executive vice-president of Nation-

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DEC to improve Pathworks' integration with NetWare

Expected to offer native support for DECnet, IPX to let NetWare clients access VMS, Ultrix servers.

By Jim Duffy
Senior Editor

BOSTON — Digital Equipment Corp. this week is expected to disclose plans to offer versions of its Pathworks network operating system that will allow Novell, Inc. NetWare clients to access data, applications and services on VMS and Ultrix servers.

At NetWorld 92 Boston, users and analysts expect DEC to discuss future versions of Pathworks that include NetWare file and print services, as well as DECnet routing for accessing and sharing enterprisewide information and resources.

The integrated NetWare functions within Pathworks will allow DOS clients to access NetWare file and print services on a VMS or Ultrix server and access applications from other systems on a DECnet network.

Users with hybrid DEC and Novell environments have been waiting for a solution that tightly couples NetWare local-area networks and DEC servers.

"It's about time," said John Parsons, director of telecommunications strategic planning at Eastman Kodak Co. in Rochester, N.Y. "We want to utilize VAXes and Ultrix processors with NetWare and make them accessible from NetWare client systems."

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NW boosts LAN coverage

FRAMINGHAM, Mass. — *Network World* last week expanded its coverage of local-area networks and LAN software coverage with the addition of Margie Wylie as senior editor of local networking.

Wylie will work out of the newspaper's San Francisco office along with Bureau Chief Timothy O'Brien, who covers network software issues.

Wylie joins *Network World* from Ziff-Davis Publishing Co.'s *MacWEEK*, where she was executive editor of connectivity. She anchored the publication's network coverage, focusing on such technologies as LANs, groupware and network applications, including database management systems.

Prior to joining *MacWEEK*, Wylie was a senior writer with International Data Group's *InfoWorld* newspaper covering network technologies and applications.

She has also worked with *LAN Times* as news editor and *NetWare Technical Journal* as senior technical editor.

Additionally, Wylie worked with Novell, Inc. as an editor in software documentation.

Wylie can be reached at 2088 Union St., Suite 2, San Francisco, Calif. 94123, or call (415) 771-4103 or fax (415) 771-2817.

Unisys boosts SNA capabilities of its DCP front-end processors

By Paul Desmond
Senior Editor

BLUE BELL, Pa. — Unisys Corp. last week provided new configuration options for its Distributed Communications Processors (DCP) through a new release of its DCP SNA software that adds PU Type 2.1 node support.

The upgraded release, SNA/net 4R1, will enable a DCP to communicate as a peer with other IBM PU 2.1 nodes — such as IBM minicomputers or OS/2 machines — or act as a message switch for attached PU 2.1 nodes. It adds another configuration option to the DCP, the front-end processor for Unisys 1100/2200 Series mainframes, which can already act as a Systems Network Architecture PU Type 2, 4 and 5 node.

"I call it the chameleon because it can look like anything now," said Karl Solie, systems programmer at McDonnell Douglas Corp. in Long Beach, Calif., a beta user of SNA/net 4R1.

Unisys also enhanced its printer support in SNA/net 4R1, provided a new menu facility that makes it easier for users to log on to multiple hosts and added support for IBM's NetView.

Lloyd Conklin, program manager for 2200 Series product marketing in Unisys' Computer Systems Group, said the DCP can now emulate a PU 2.1 device and switch messages among remote PU 2.1 nodes without involving an IBM host. That capability, dubbed Configured Routing, lets PU 2.1 devices attached to a DCP access hosts via a Synchronous Data Link Control connection between the DCP and an IBM front-end processor. LU 6.2 sessions to a host can be supported in that fashion, Conklin said.

SNA/net 4R1 also provides a Terminal Operator Menu Facility (TOMF), which gives terminal users an easy-to-use menu for accessing applications on Unisys or SNA hosts. "It masks all the cumbersome technical command language for establishing sessions and signing onto the network," Conklin said.

"That's one of the primary reasons we went to SNA/net," said Janice Rhode, systems programmer at the Nevada Highway Patrol in Carson City, Nev., and another SNA/net 4R1 beta user. The highway patrol will be using its DCPs to front end both Unisys and IBM hosts, she said. TOMF will make it easier for users to access applications on either host while maintaining full-screen functionality.

SNA/net 4R1 also supports a new feature that improves access to IBM printers from Unisys hosts. Previously, if a Unisys user issued a request to an IBM printer that was busy, the user had to try again later.

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New Legent tool eases token-ring net management

By Joanne Cummings
Staff Writer

VIENNA, Va. — Legent Corp. last week announced a LAN-based software module that enables users of the company's mainframe-based SNA performance monitor to centrally manage both SNA and token-ring networks.

Legent's LANSpy 1.0 software resides on a single node on each token-ring local-area network and reports performance statistics to the company's Systems Network Architecture network monitor, NetSpy, which runs on an IBM mainframe.

LANSpy monitors and collects information on LAN problems and provides data on workstation, SNA and media access control-layer traffic, as well as file-server statistics, such as utilization, and the time from request to reply. It also details IBM 3270 gateway statistics such as inbound/outbound queue depth.

From NetSpy, users can set performance thresholds for LANSpy. When a threshold is exceeded, LANSpy sends an alert to NetSpy, which displays it in real time. LANSpy can also send configuration information to NetSpy, enabling NetSpy users to view a listing of all nodes on a token ring with addresses, type and station name.

NetSpy can pass LANSpy alerts to IBM's NetView or Systems Center, Inc.'s Net/Master network management systems.

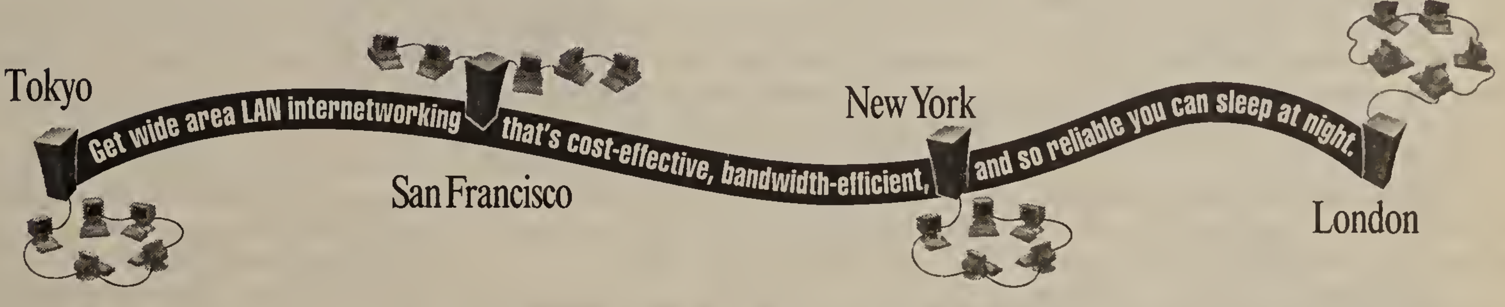
Currently, NetSpy information is displayed on a mainframe-attached terminal with a 3270-type display. But Himler said the company plans to provide a graphical user interface based on IBM's Systems Application Architecture/Common User Access interface.

Early users said LANSpy eases problem determination and configuration. Erwin Beliner, head of the systems performance group at Chevron Information Technology Co. in San Ramon, Calif., has been beta-testing LANSpy on his SNA/token-ring network since September.

"LANSpy does a good job of diagnosing

(continued on page 73)

It's time to put some real backbone into your LAN internetworking.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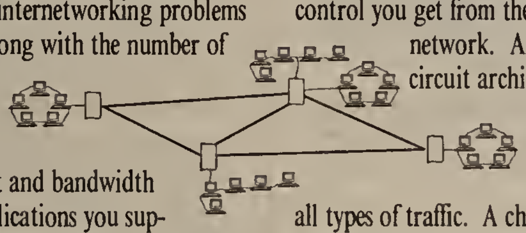

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Datapoint to roll out new Arcnet version

By Joanne Cummings
Staff Writer

BOSTON — Datapoint Corp. this week is expected to unveil at NetWorld 92 Boston the long-awaited 20M bit/sec version of its Arcnet local-area network.

Datapoint announced the 20M bit/sec ArcnetPlus architecture, which is designed to be backward compatible with existing 2.5M bit/sec Arcnet equipment, in April 1990 and had originally promised to roll out products and chipsets by early 1991.

> “Many customers have made the initial investment in Arcnet and don’t want to throw it out.”
>
> ▲▲▲

Now, almost a year later, Datapoint is rolling out its first ArcnetPlus products: the ArcnetPlus PC LAN Adapter, an interface for IBM Personal Computer ATs, and two hubbing devices.

Like the earlier Arcnet, ArcnetPlus is based on a bus topology, uses RG-59 or RG-62 coaxial cable and employs a token-passing-type access method, according to Robert Hollingsworth, marketing director at Datapoint. The company intends to offer support for unshielded twisted pair by year end, he added.

The new PC interface comes with drivers for Novell, Inc.’s NetWare 3.11 and 2.2 as well as Datapoint’s RMS/XA proprietary Arcnet operating system. Like traditional Arcnet, the new version can support distances of up to 2,000 feet, although the twisted-pair version will probably support distances of only 100 meters, Hollingsworth said.

The card can be configured to support either 2.5M or 20M bit/sec, depending on a user’s needs. It is interoperable with traditional Arcnet products, so users can upgrade certain nodes in a net to support higher speeds while maintaining the ability of those nodes to communicate with lower speed devices, Hollingsworth explained. An NCR Corp. controller on the adapter determines the speed of incoming signals and adjusts itself accordingly.

The two new wiring hubs that support ArcnetPlus include a five-port device and a 16-port model. Both hubs support traditional Arcnet as well as ArcnetPlus, Hollingsworth said. With traditional Arcnet, a maximum of 10 16-port hubs can be daisy-chained, while only eight 16-port hubs can be linked with ArcnetPlus.

In addition, Datapoint will be providing developer kits, including chipsets and documentation, to third parties for both the adapters and wiring hubs. It will also provide certification testing to ensure that third-party products conform to Arcnet and ArcnetPlus standards.

Hollingsworth said ArcnetPlus, like traditional Arcnet, conforms with ANSI ATA 878.1 standards for Arcnet LANs.

According to analysts, the announcement is good news for Arcnet users. “For the Arcnet-installed base, this is very positive,” said Charlie Robbins, vice-president of Aberdeen Group, Inc., a consultancy in Boston. “Many customers have made the initial investment in Arcnet and don’t want to throw it out.”

The new products, which will be demonstrated at NetWorld this week, will be generally available in mid-April. Hollingsworth declined to provide specific pricing for the products but said the adapter would be priced competitively with 16M bit/sec token-ring adapter cards. He declined to offer pricing for the hubs. ☐

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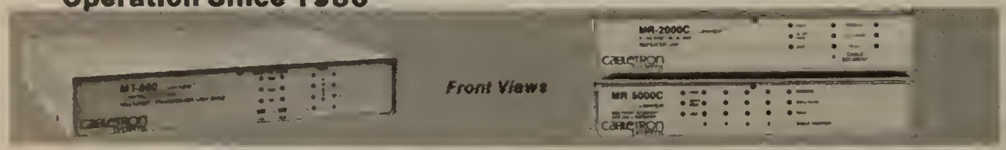

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Unisys boosts SNA capabilities of FEPs

continued from page 5

Now the request will be queued and automatically entered when the printer is free. “That’s really important for us because [most of our] printers are on the IBM network,” Solie said. McDonnell Douglas currently uses its own queuing system, with channel connections between its IBM and Unisys hosts, to support the same function. But the system is time-consuming and can easily get bogged down.

In addition, SNA/net 4R1 also provides DCP support under IBM’s NetView host-based net management system. Critical events from SNA/net and other DCP facilities can be logged and shipped to the IBM host via NetView’s Terminal Access Facility. Similarly, SNA/net 4R1 can respond to some NetView commands.

SNA/net’s pricing structure has also been revamped with 4R1. In the past, the software was sold as a single package with all features included and ranged in price from $22,197 to $63,420. Now, packages with different features will be sold separately.

Base SNA/net 4R1 software is required for all options and ranges in price from $3,595 to $10,273. PU Type 4 and 5 support costs between $16,428 and $46,973, PU 2.1 software ranges from $5,145 to $14,700, and PU 2 support costs between $2,966 and $8,474. All the new software will be available in March. ☐

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Cabletron adds muscle to LAN hub

continued from page 1

ports and 26 ports, respectively. The CXRMIM is a 12-port 10Base2 module and the FORMIM-22 is a 12-port fiber-optic inter-repeater link module.

The company said that by outfitting its flagship MMAC with the four new MIMs, the hub’s existing 650M bit/sec backplane can now be split into three independent Ethernet buses, allowing it to support as many as three Ethernets. The modules will also provide additional fault tolerance.

The four new MIMs come with on-board Repeater Interface Controller (RIC) chip technology Cabletron codeveloped with National Semiconductor Corp.

Placing the RIC chips on each module improves fault tolerance by eliminating a single point of failure. Previously, repeater functions were performed on a single board in the hub. By placing the RIC technology on each of the individual modules, Cabletron is distributing the repeater function to each of the MMAC modules, which localizes the effect of a failure, instead of affecting the entire hub.

Another key new feature is the four-port bridging and management module. The Ethernet Management Module with Ethernet (EMME) is a combined Reduced Instruction Set Computer (RISC)-based multiport bridge and Ethernet management module with full Simple Network Management Protocol support.

The device enables users to link the hub’s three Ethernets, as well as provide a connection to an external LAN backbone. In effect, the EMME acts as a switch between the Ethernets, passing traffic between the different LANs on the fly. The EMME performs Ethernet bridging of 14.8K packet/sec.

The EMME will also perform the repeater functions for the MMAC’s existing MIMs.

In addition to SNMP support, the module also includes support for the Internet Engineering Task Force’s Remote Monitor management information base, which includes filtering, alarms, packet capture and trend data.

The EMME’s RISC-based architecture provides increased processing power and memory to perform enhanced functions such as protocol and statistical breakdowns and network traffic analysis.

John Cummings, manager of software engineering at The Turner Corp., a construction company in New York City and an MMAC user, said the enhancements would help his network.

“By allowing us to segment LANs within one hub, we’ll be able to achieve a lower cost per node while maintaining the same performance levels,” Cummings said. Turner has seven MMACs supporting 400 users.

Cummings said the new modules will enable him to eliminate two hubs needed to support his network. The concomitant reduction in chassis and power supply requirements will result in significant cost savings.

> “By allowing us to segment LANs within one hub, we’ll be able to achieve a lower cost per node while maintaining the same performance levels,” Cummings said.
>
> ▲▲▲

The advanced network management capabilities will obviate the need for third-party protocol or packet analyzer devices, he added.

“It takes network management two or three steps beyond where it’s been on a network management card. I’ll be getting much better management diagnostics,” Cummings said. “Today, I can’t look at the data packets as they are actually being transmitted across the backplane. With the new capabilities, I’ll be able to do packet analysis on the node.”

The new modules are all manageable through Cabletron’s Remote Lanview/Windows and Spectrum network management platforms or any SNMP-compliant element manager.

The EMME bridge/management module costs $7,995. The four RMIM modules range in price from $2,495 and $4,295. All five modules will be available in May. ☐

The absolutely incredible story of how George Gilbert went from ordinary network manager to network god overnight...

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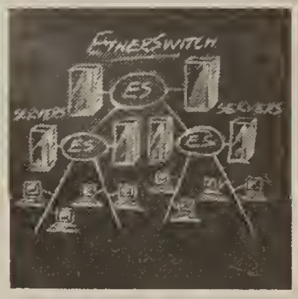

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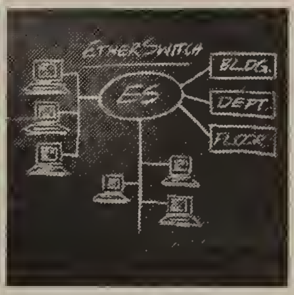
EtherSwitch boosts performance among and within workgroups.



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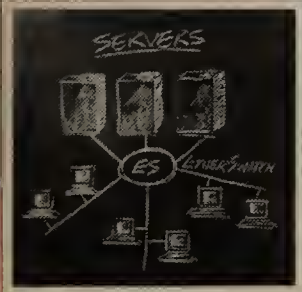

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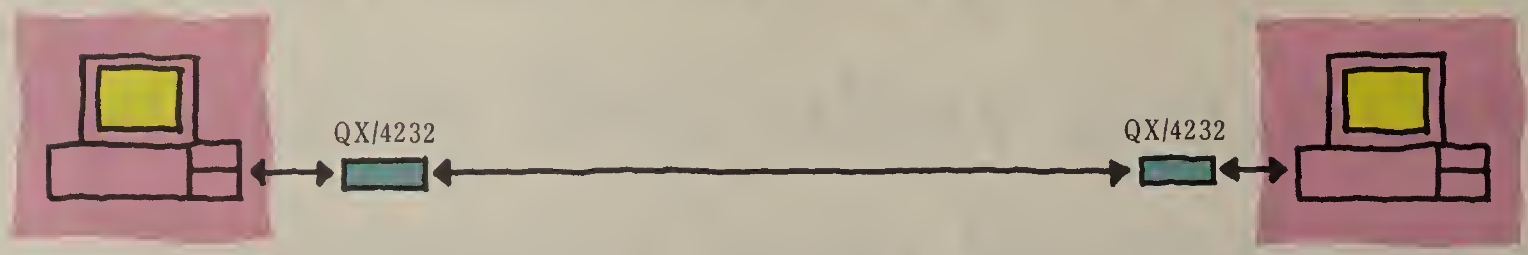

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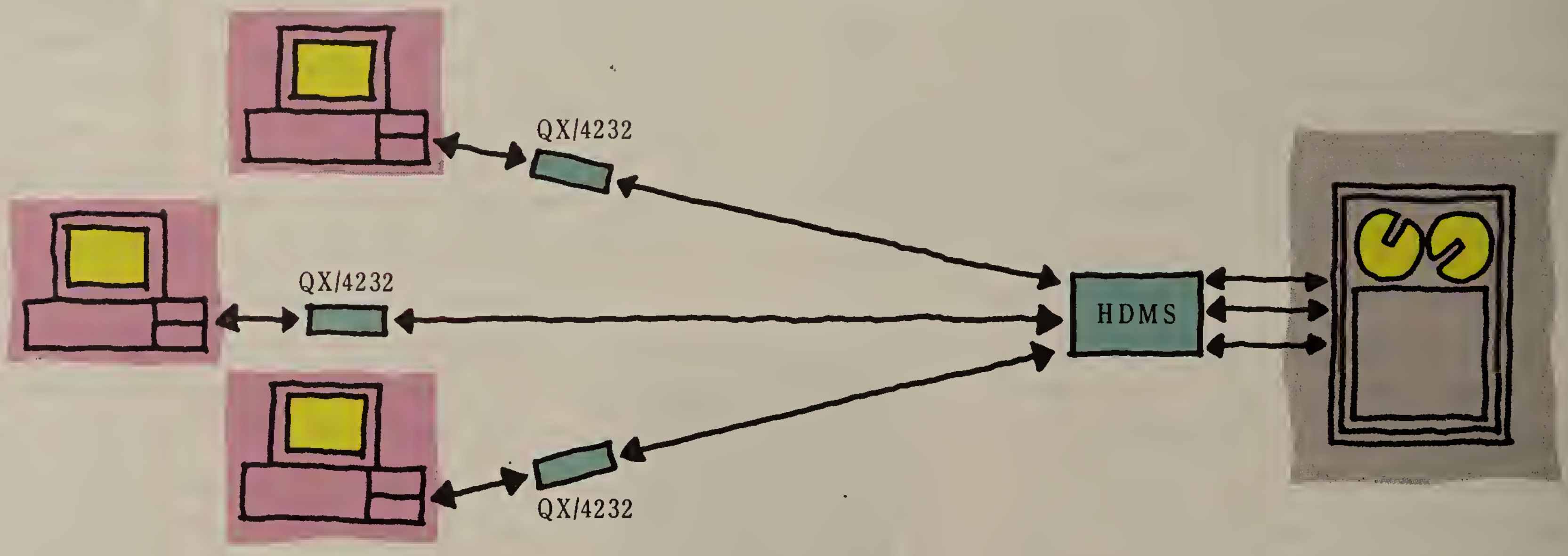

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1 Industry: (check one only)

01. ☐ Manufacturers (other than computer/communications)
02. ☐ Finance/Banking
03 ☐ Insurance
04 ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07 ☐ Hospitality
08 ☐ Retail/Wholesale Trade
09 ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13 ☐ Government State/Local
14. ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24. ☐ Other ____________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt
2. ☐ LAN Mgmt
3. ☐ Datacom/Telecom Mgmt
4. ☐ Engineering Mgmt

MIS MANAGEMENT
5. ☐ MIS, IS, IT, Mgmt
6. ☐ Engineering Mgmt

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt (CIO, CEO, Pres, VP, Dir, Mgr, Financial Mgmt)

8. ☐ Consultant (Independent)

9. ☐ Other ____________

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1

4 Check all that apply in columns A and B:
A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services in the next 12 months.

	Involved A	Plan to Purchase B	
	A	B	**LOCAL-AREA NETWORKS**
01.	☐	☐	Local-Area Networks
02.	☐	☐	LAN Servers
03.	☐	☐	LAN Operating Systems Software
04	☐	☐	Superservers
05.	☐	☐	Data Base Servers (Oracle, Sybase, etc)
06.	☐	☐	Terminal Servers
07.	☐	☐	LAN Services
08.	☐	☐	LAN Storage Devices (Optical, Tape, Disk, Etc. including Backup Systems)
09.	☐	☐	Network Test Equipment
10.	☐	☐	Hubs
11.	☐	☐	Cables, Connectors, Baluns
12.	☐	☐	UPS
13.	☐	☐	Network Adapter Boards
14.	☐	☐	Central Office LANs
15.	☐	☐	Wireless LANs
16.	☐	☐	SNMP Network Management
	A	B	**INTERNETWORKING**
17.	☐	☐	Bridges
18.	☐	☐	Routers
19	☐	☐	Gateways
20	☐	☐	Bridge/Router
21.	☐	☐	Hubs
22.	☐	☐	Intelligent Hubs
23.	☐	☐	Communications Servers
	A	B	**COMPUTERS/PERIPHERALS**
24.	☐	☐	Micros/PCs
25	☐	☐	Minis
26.	☐	☐	Mainframes
27	☐	☐	Laptops
28.	☐	☐	Workstations
29.	☐	☐	Image Processing Workstations
30.	☐	☐	Front-End Processors
31.	☐	☐	Terminals
32	☐	☐	Printers
33	☐	☐	Cluster Controllers
34	☐	☐	Fax Machines
	A	B	**SOFTWARE**
35.	☐	☐	Network Management
36.	☐	☐	Micro to Mainframe
37.	☐	☐	Network Security
38.	☐	☐	Call Accounting
39.	☐	☐	Communication
40.	☐	☐	Word Processing
41.	☐	☐	Data Base Management
42	☐	☐	Spreadsheet
43.	☐	☐	Groupware
44.	☐	☐	EDI
45	☐	☐	E-Mail
46	☐	☐	Windows/Graphical User Interface
47.	☐	☐	4-GL
48	☐	☐	Multimedia
49	☐	☐	Graphics
	A	B	**WIDE-AREA NETWORK EQUIPMENT/SERVICES**
50	☐	☐	Modems (9.6kbps and over)
51.	☐	☐	Modems (under 9.6kbps)
52.	☐	☐	T-1
53	☐	☐	T-3
54.	☐	☐	Fractional T-1
55.	☐	☐	Data Switches
56.	☐	☐	Matrix Switches
57	☐	☐	Packet Switching
58	☐	☐	Protocol Converters
59.	☐	☐	Network Management Systems
60.	☐	☐	Terminal Emulation Boards
61	☐	☐	Diagnostic/Test Equipment
62.	☐	☐	DSU/CSU
63	☐	☐	Data Compression Equipment
64	☐	☐	Microwave
65	☐	☐	Fax Boards
66.	☐	☐	VSAT
67.	☐	☐	Fiber Optic
68	☐	☐	Satellite
69.	☐	☐	ISDN
70.	☐	☐	PBXs (over 1000 lines)
71.	☐	☐	PBXs (200 - 1000 lines)
72.	☐	☐	PBXs (under 200 lines)
73	☐	☐	Automatic Call Distributors
74.	☐	☐	Voice Messaging Systems
75	☐	☐	Videoconferencing Systems
76	☐	☐	Central Office Switch
77.	☐	☐	Voice Response/Processing
78	☐	☐	Switched Voice
79	☐	☐	Dedicated Leased Line
80.	☐	☐	Digital Data
81.	☐	☐	Switched Data
82	☐	☐	Centrex
83.	☐	☐	On-Line Information
84	☐	☐	E-Mail
85.	☐	☐	SMDS
86	☐	☐	Image Processing
87	☐	☐	Audio Teleconferencing
88.	☐	☐	Local Services
89	☐	☐	WATS MTs
90.	☐	☐	International
91.	☐	☐	Virtual Networks
92.	☐	☐	Frame Relay
XX.	☐	☐	None of the above

5 What are your primary responsibilities? (check all that apply)

1. ☐ LANs
2. ☐ Internetworking
3. ☐ WANs

6 What is the scope of your involvement in purchase decisions for Network products & services? (check one only)

1. ☐ Enterprisewide (Organization/Subsidiary/Division)
2. ☐ Multienterprise (Consultants)
3. ☐ Departmentwide

7 Is your network: (check all that apply)

LOCAL AREA NETWORKS
1. ☐ Local (within building)
2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS
3. ☐ International
4. ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

8 Which of the following network architectures/protocols are used? (check all that apply)

01. ☐ SNA
02. ☐ DECNET
03. ☐ OSI
04 ☐ GOSIP
05 ☐ MAP/TOP
06. ☐ TCP/IP
07 ☐ DCA (Unisys)
08. ☐ X.25
09. ☐ NOVELL IPX/SPX
10. ☐ APPC/APPN/LU 6.2
11. ☐ NETBIOS
12. ☐ DEC LAT
13. ☐ APPLETALK
14. ☐ OTHER

9 What is your LAN Operating System? (check all that apply)

01. ☐ LOCALTALK (APPLETALK)
02. ☐ BANYAN (VINES)
03. ☐ DCA (IRMALAN)
04 ☐ IBM (LAN SERVER)
05 ☐ IBM (PC LAN PROGRAM)
06. ☐ MICROSOFT (LAN MANAGER)
07 ☐ UNGERMANN-BASS
08 ☐ NOVELL (NETWARE, 2.X, 3.X)
09 ☐ PROTEON (PRONET)
10. ☐ SITKA (TOPS)
11. ☐ 3COM (3+, 3+OPEN)
12 ☐ Other ____________

10 What is your LAN environment? (check all that apply)

1. ☐ 4M TOKEN RING
2. ☐ 16M TOKEN RING
3. ☐ ARCNET
4. ☐ ETHERNET
5. ☐ STARLAN
6. ☐ FDDI
7. ☐ LOCALTALK
8. ☐ 10BASE-T
9. ☐ OTHER ____________

11 Are you involved in the implementation of client/server applications?

Yes ☐ No ☐

12 Which operating system do you utilize? (check all that apply)

01. ☐ DOS
02. ☐ UNIX/XENIX
03. ☐ OS/2
04 ☐ OS/2 EX. ED.
05. ☐ MVS
06. ☐ VM
07. ☐ VMS
08. ☐ NUBUS
09. ☐ WINDOWS
10. ☐ OTHER

13 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3 ☐ South America
4 ☐ Australia
5. ☐ Middle East

14 Which of the following vendors equipment do you currently have installed in your network? (check all that apply)

Vendor	Mainframes A	Minis B
01. DEC	☐	☐
02 IBM	☐	☐
03. AMDAHL	☐	☐
04 AT&T	☐	☐
05 BULL HNIS	☐	☐
06 NCR	☐	☐
07 DATA GENERAL	☐	☐
08. WANG	☐	☐
09 HEWLETT-PACKARD	☐	☐
10 PRIME	☐	☐
11 TANDEM	☐	☐
12. UNISYS	☐	☐
13 CONTROL DATA	☐	☐
14 OTHER	☐	☐

15 Please indicate the number of Microcomputers/Workstations:
A. Presently installed in your network.
B. The approximate quantity you plan to install in the next 12 months.

Micros/Workstations	Presently Installed A	Plan to Install Next 12 Months B
1. Macintosh	______	______
2. PCs Based on 80586 Chips	XXXX	______
3. PCs Based on 80486 Chips	______	______
4 PCs Based on 80386 Chips	______	______
5. PCs Based on 80286 Chips	______	______
6. PCs Based on 8086/8088 Chips	______	______
7. Risc-Based Workstations	______	______
8. Unix-Based Workstations	______	______

Use Numbers Only

16 Estimated value of networking equipment and services:
A. Which you helped specify, recommend or approved in the last 12 months?
B. Which you plan to help specify, recommend or approve in the next 12 months?

	A	B	
1.	☐	☐	$100 million and over
2.	☐	☐	$50 - $99.9 million
3	☐	☐	$25 - $49.9 million
4	☐	☐	$20 - $24.9 million
5	☐	☐	$10 - $19.9 million
6	☐	☐	$5 - $9.9 million
7.	☐	☐	$1 - $4.9 million
8	☐	☐	$500,000 - $999,999
9	☐	☐	Under $500,000

17 Estimated gross annual revenue of your entire company/institution: (check one only):

1 ☐ Over $10 billion
2. ☐ $1 to $9.9 billion
3 ☐ $500 to $1 billion
4 ☐ $100 to $499.9 million
5. ☐ $50 to $99 9 million
6. ☐ $10 to $49.9 million
7 ☐ $5 to $9.9 million
8 ☐ Under $5 million

18 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000
2 ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4 ☐ 1,000 - 2,499
5 ☐ 500 - 999
6 ☐ Under 500

911

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"We believe IBM's [router] announcement endorses multiprotocol router technology and internetworking as a concept. It could conceivably broaden the market opportunity for all participating vendors."

Tom Erickson
Research analyst
Wessels Arnold & Henderson
Minneapolis

People & Positions

Microsoft Corp. last week announced that **Michael Hallman**, the company's president, is resigning March 1 following a recent decision made by Microsoft's board of directors to create a new executive panel. Hallman will remain as a consultant to the company.

William Gates, Microsoft's chairman and chief executive officer, said the new structure will include an office of the president that will be shared by three newly appointed executive vice-presidents reporting directly to him.

Michael Maples, formerly senior vice-president of the applications division, has been appointed as head of the worldwide products group. In this position, he will address all new Microsoft product development activities.

Steven Ballmer, formerly senior vice-president of systems software, has been named head of the worldwide sales and support group. All personnel involved in worldwide sales, support and marketing activities will report to him.

Francis Gaudette, formerly senior vice-president of finance and administration as well as chief financial officer, has been appointed head of the worldwide operations group. ◻

NIST offers to align mgmt. profile with NM Forum

Technical differences could slow down effort.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The National Institute of Standards and Technology (NIST) recently said it is willing to meld network management profiles with the Network Management (NM) Forum, but technical differences could pose formidable obstacles.

Vendors fear that if the efforts fall short, they could be forced to develop separate sets of management products for the different specifications, which would drive up costs for users and dash any hopes of interoperability between products.

"Users and vendors are now realizing that the costs of doing this work are escalating rapidly," said William Gilbert, AT&T network management director and president of the NM Forum.

In the recent Open Management Roadmap announcement, NIST, the NM Forum and a dozen industry groups joined hands to support of a common set of specifications ("Industry consortia expected to pledge their support for Roadmap," *NW,* Jan. 27).

Fran Nielsen, manager of NIST's net management group, said her organization is willing to resolve the differences between the Government Network Management Profile (GNMP) and the Forum's Open Management Interoperability Point (OMNIPoint) 1 specification. "There's a lot that can happen now that we have the harmonization process," she added.

GNMP, scheduled to be finalized in June as a Federal Information Processing Standard, will probably become a mandatory purchasing guideline for federal agencies in late 1993. OMNIPoint 1, targeted for September release, is expected to be the basis for commerical products by many NM Forum members in the future.

Both NIST and the NM Forum point out that the thorniest harmonization issues involve the Open Systems Interconnection-managed object descriptions, which describe network devices or attributes on which management information is retrieved.

Because the international standards process does not have a clear method for incorporating all object descriptions, the NM Forum, NIST and other groups, such

(continued on page 11)

INDUSTRY BRIEFS

Newbridge reorganizes; Madsen resigns. Newbridge Networks Corp. last week announced a reorganization that involves the resignation of its U.S. subsidiary's president and the creation of three new business units.

Under the reorganization, Peter Madsen resigned his positions as vice-president and general manager of the United States Region and president of Newbridge Networks, Inc., Newbridge Networks Corp.'s U.S. subsidiary.

Michael Pascoe, vice-president and general manager of the Americas Region, will assume the role of president of Newbridge Networks, Inc.

The new business units under the reorganization are the MainStreet Access Product unit, MainStreet Business Networks unit and MainStreet Advanced Network Products unit.

The MainStreet Access Product business unit includes channel banks, terminal adapters and the Transmission Access Processor line of inverse multiplexers and data service unit/channel service units. Dan Rusheleau, a Newbridge Networks Corp. director, has been named general manager of the business unit.

The MainSteet Business Networks unit will comprise network management products, muxes and internetworking products. Conrad Lewis, previously vice-president of product management for Newbridge Networks Corp., has been named vice-president and general manager of the unit.

The MainStreet Advanced Network Products unit will focus on value-added applications that run on the processors of Newbridge Networks Corp.'s MainStreet multiplexers. Products from this unit will include the parent company's voice processing offerings. ◻

Emergence of a price war

Price-cutting in the 10Base-T hub market

Oct. 1991	SynOptics Communications, Inc. cuts price of its 10Base-T modules for high-end concentrators by 40% and 10Base-T work group concentrators by 38%. Reduces per-port price to between $120 and $170.
Dec. 1991	3Com Corp. unveils managed 10Base-T hubs priced at $113 per port.
Jan. 1992	Hewlett-Packard Co. cuts price of its managed 12-port 10Base-T hubs by 18% to $158 per port and unmanaged 8-port hubs by 10% to $81 per port.
	David Systems, Inc. trims price of its 13-port 10Base-T hubs by 14% to $146 per port.
	NetWorth, Inc. cuts price of its unmanaged 9-port 10Base-T hubs to $72 a port.
Feb. 1992	HP cuts price of its managed 48-port 10Base-T hubs by 40% to less than $100 per port.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

HP escalates hub war with deep price cuts

Vendor slashes prices up to 40% on fixed-port 10Base-T hubs, following SynOptics and others.

By Bob Brown
Senior Editor

PALO ALTO, Calif. — In a move that could escalate an emerging price war in the mid-range and low end of the 10Base-T wiring hub market, Hewlett-Packard Co. last week slashed the price of its 10Base-T hubs by as much as 40%.

The price cuts come in the wake of major markdowns by David Systems, Inc. and SynOptics Communications, Inc., among other hub makers, and has spawned a buyer's market for 10Base-T gear. The reductions involve mostly hubs with a fixed number of ports rather than the chassis-style devices.

HP's biggest price cut (40%) is for its managed 48-port EtherTwist Hub Plus, a stackable, fixed-port hub. Its price was sliced from $7,999 ($167 per port) to $4,795 ($100 per port).

"We have maintained ever since our introduction of these products nearly two years ago that we are going to be the price leader," said Alan Housely, product marketing manager at HP's Roseville, Calif., Networks Division. "Given recent moves by other vendors to be competitively priced in this market, we've decided to take the offensive and defend our statement of being a price leader."

Even with the cuts, HP will maintain decent profit margins on the hubs, Housely said.

One reason that HP can afford to cut prices is because its fixed-port architecture is well suited for continuing miniaturization, which can result in lower costs, he added.

HP cut the price of its 12-port managed EtherTwist Plus Hub by 18% from $2,299 ($192 per port) to $1,895 ($158 per port), while it reduced the price of its unmanaged eight-port EtherTwist Hub/8 offering from $725 ($91 per port) to $650 ($81 per port), a 10% difference.

Follow the leader

Analysts said they expect other vendors to respond with price cuts of their own.

"HP has put a stake out there, and other vendors need to react to stay competitive," said Janet Hyland, director of Network Strategy Research at Forrester Research, Inc., a Cambridge, Mass., market research firm.

HP's price cuts come in the wake of other recent price activity in the 10Base-T market (see graphic, this page).

In December, 3Com Corp. announced an aggressively priced line of managed and unmanaged 10Base-T hubs. Last month, David Systems trimmed the prices of its managed ExpressNet hubs and unmanaged VolksNet hubs.

SynOptics, whose 10Base-T products had been priced at a premium compared to many of its competitors' offerings, surprised the industry last fall when it made major price cuts on a host of its 10Base-T equipment, including 10Base-T modules for its chassis-based System 3000 wiring concentrator and a fixed-port 10Base-T work group hub.

Initially, analysts did not think SynOptics' cuts would trigger a price war because SynOptics' prices were high to begin

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3Com returns to roots with focus on LAN, internetwork devices

By Bob Brown
Senior Editor

SANTA CLARA, Calif. — Roughly a year after exiting the network operating system market, 3Com Corp. has returned to its roots.

In a recent interview, Eric Benhamou, 3Com's president and chief executive officer, said the company has refocused its resources on local-area network adapters and internetworking equipment such as routers and intelligent wiring hubs.

Ironically, before 3Com launched its network operating system campaign, it was predominantly an adapter card supplier and had a burgeoning internetworking equipment business via its 1987 acquisition of Bridge Communications, Inc.

3Com's adapter business now accounts for more than half of the company's revenue, and the vendor's internetworking product lines are the fastest growing part of its portfolio, Benhamou said.

3Com's goal is to be a leader in the hub and router markets, as well as in the adapter card and terminal server markets, he added.

The vendor's acquisition last month of the data networking products business of BICC Group PLC, Europe's largest hub supplier, is proof of the company's effort to expand its internetworking product lines, Benhamou said. 3Com and SynOptics Communications, Inc. recently agreed to phase out an OEM relationship under which 3Com resold SynOptics' hubs.

Analysts gave 3Com mostly favorable reviews for its first year as a full-fledged player in the internetwork market. With its aggressive pricing, manufacturing capabilities and distribution channels, 3Com is poised for a big payoff in the low end of the hub and router markets where demand is expected to soar. To be successful in the overall hub market, however, the company needs to evolve to a consistent product architecture and away from the smattering of hub architectures it offers today, analysts said.

Given that 3Com was late to focus on the router and hub markets, the company has come a long way in gaining market share. According to analysts, the acquisition of the BICC business puts 3Com as high as fourth in some hub market share ratings, while the company has become one of the top three router vendors.

In the hub market, 3Com is going after the high-end, mid-tier and low-end segments, Benhamou said.

The company has announced it will be one of the first vendors to ship a high-end, third-generation hub, thanks to a technology agreement signed with Synernetics, Inc. that helped make 3Com's LinkBuilder 3GH hub possible. The 3GH, which is in beta sites and begins shipping this quarter, integrates hub and router technology.

In the middle tier of the hub market, 3Com is banking on its acquisition of the BICC business to increase its market presence. Initially, 3Com established a foothold in this market segment via the SynOptics OEM deal but chose to buy the BICC business to bring the technology in-house and boost its position in the fast-growing European internetworking market.

3Com is going after the low end of the hub market with its LinkBuilder 10BT product line, a series of hubs built in-house. These hubs are priced aggressively — $110 per port for a Simple Network Management Protocol-based model.

Although 3Com's hub line is a mix of four product architectures, including the SynOptics hubs, Benhamou said this is not a drawback. 3Com has positioned itself as a systems integrator, so tying together various hub products is par for the course.

Others said 3Com's hub product line needs to be simplified. "3Com's greatest challenge is coming up with a consistent architecture across its internetworking products," said Charlie Robbins, director of communications research at Aberdeen Group, Inc. in Boston.

A consistent architecture would, for example, enable users to employ the same types of media cards in any hub across 3Com's product line — something users cannot do today with 3Com's hub offerings, analysts said.

As in the hub market, 3Com is offering a range of router products.

However, 3Com is avoiding the very top of the market, where Wellfleet Communications, Inc. has unveiled a router with a 1G bit/sec backplane. Other router vendors are expected to follow Wellfleet's lead, Benhamou said.

"There are only so many customers you can attract with a $70,000 router," he said. "One slight notch below that is still a very high-end market but of bigger volume, and this is really what we are focusing on."

3Com's recent introduction of the NetBuilder II line of routers is aimed at the high end of the router market, a segment currently dominated by Cisco Systems, Inc. and Wellfleet. 3Com's high-end routers are based on Reduced Instruction Set Computer/application-specific integrated circuit technology, which results in competitive price/performance ratios. The devices can also handle Fiber Distributed Data Interface connections and provide

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links to token-ring and Ethernet LANs. They are scheduled to ship in the spring.

3Com's original NetBuilder supports most of the major protocols except IBM's Systems Network Architecture. These routers are well suited for running in remote offices and feeding into higher end routers, Benhamou said.

By focusing on both the hub and router markets, he said 3Com will be particularly well positioned as customers increasingly demand integrated router and hub products.

"Today, a year later, we believe that we've made the right set of choices and that this strategy is on target with what is relevant today in the industry and what customers require," Benhamou said. ▣

HP escalates hub war with deep price cuts

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with, but opinions are changing.

"I thought [SynOptics' cuts were] going to cause a price skirmish in unmanaged hubs, but I thought managed hubs would stay stable because that's where these guys are going to make their money," said Todd Dagres, director of data communications research at The Yankee Group in Boston. "What's happened is that price skirmish has broken into a price war in mid-range and low-end unmanaged and managed hubs."

Increased competition and a lack of differentiation between vendors' hubs have spurred the price battle, said Hyland.

"The prices of physical LAN connections are falling through the floor as hub and adapter prices are driven down," she said. "I hope users will redeploy the money they would have spent on physical LAN connections on great new applications instead."

Push toward buying managed

One result of all the price-cutting in the hub market is users will have less incentive to buy unmanaged hubs because managed hub prices are falling. "It makes you ask the question, why buy unmanaged?" Housely said. "The price cuts make managed hubs more economical in virtually any size work group."

The price battle in the hub market's low-end and mid-tier should also filter up to the top of the market and put price pressure on offerings in that segment, Dagres said.

Price competition has also been rampant in other parts of the 10Base-T equipment market, Housely said.

HP, for example, also cut the price of its 10Base-T PC LAN adapter/8 by 13% from $345 to $299 and PC LAN adapter/16 by 17% from $445 to $370; its managed 10:10 LAN bridge from $4,499 to $3,900, a 13% decrease; its unmanaged HP 10:10 LAN bridge LB from $2,500 to $1,950, a 22% drop; and its four-port HP router HR from $9,000 to $8,000, an 11% reduction. ▣

NIST offers to align profile with forum

continued from page 9

as Unix International, have begun writing descriptions for devices such as computers or modems. The result is what users and vendors are calling an "object explosion," which threatens to create interoperability problems and undermine the usefulness of OSI network management due to the duplication of objects.

According to Helene Armitage, Unix International technical director, her group, along with X/Open Company, Ltd., the Object Management Group and the Open Software Foundation, Inc., joined the Roadmap before they had begun writing object descriptions, averting object duplication.

The NM Forum and NIST, relying on the work of the Network Management OSI Implementors Workshop it hosts, were well along in object descriptions.

NIST and the NM Forum must now reach compromises on the objects going into GNMP before its targeted June release date in order to harmonize their specifications. "There's a lot of work to do," Nielsen said. "At a minimum, the government is going to put out a procurement spec."

Other problems presenting a roadblock to the Roadmap process are the OSI systems management functions, which include alarm, event, configuration and state management.

The International Standards Organization has not even assigned these standards draft status as International Standardized Profiles (ISP), although Bruce Murrill, technical director of the NM Forum, said the forum expects this to occur this summer.

Nielsen said the government will probably not wait for the draft ISPs, but instead may include earlier versions of systems management standards. Differences between NIST and the NM Forum on systems management will create interoperability problems and drive up development costs.

Vendors are reluctantly considering strategies to cope with the divergent net management profiles if the newfound cooperative effort between NIST and the NM Forum is unsuccessful.

Ray Williams, senior technical staff member at IBM Networking Systems, said IBM will implement both GNMP and OMNIPoint 1 if the NM Forum and NIST cannot agree on a common set of specifications.

William Gassman, Digital Equipment Corp.'s network management marketing director, said his company will handle proliferating profiles by fielding a product that translates GNMP to OMNIPoint 1 or the U.K. Government OSI Profile. ▣

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TELECOMMUNICATIONS

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Worth Noting

AT&T recently announced an average increase of 8% in the price of its private branch exchanges, which include the Definity Generic 1, 2 and 3, as well as the older System 75 and 85. The price hikes will take effect in April.

Carrier Watch

Indiana Bell Telephone Co. recently announced plans to invest $200.3 million this year to upgrade its telecommunications net.

The bulk of the money will be spent on seven digital switching systems, fiber-optic cable, software for a dozen access tandem switches and Common Channel Signaling System 7 (CCS7) equipment.

The carrier said the money has helped keep the digitization of its network moving forward. Almost half of Indiana Bell's 1.7 million lines are currently served by digital switching systems. By year end, about 60% of all lines will be served by digital switches.

The carrier said it plans to activate new digital switches this year in the Indiana cities of Anderson, Gary, Hammond, Highland, Jeffersonville and West Newton. It is also installing a CCS7 network in northwest Indiana, as well as in Anderson, Bloomington, Frankfort, Jeffersonville, Lebanon, Middletown, New Albany, Osceola, Shelbyville and South Bend.

All Indiana Bell communications customers will be able to access CCS7-supported services by the end of 1995.

The software in the 12 access tandem switches will enable firms to change their long-distance carrier without changing their 800 numbers.

Indiana Bell also said it will install 6,800 miles of fiber this year in order to provide alternate paths between its central offices. ◘

Resellers charge AT&T with Option 58 discrimination

Several file complaints with FCC over tariff issue.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Several resellers last week filed complaints with the FCC accusing AT&T of discrimination for refusing to sell them Tariff 12 Option 58, with one even claiming that it has been driven into bankruptcy by the carrier's action.

The complaints were filed in response to an AT&T emergency request to the Federal Communications Commission seeking permission to discontinue selling Tariff 12's Option 58. The resellers claim that the attempt to freeze Option 58 sales is the latest in a long string of hostile actions that the carrier has taken to restrict their business.

"AT&T has conducted a backroom vendetta against the resale of SDN and Tariff 12 options," VNI Communications, Inc., a reseller based in Atlanta, stated in its filing with the FCC. "This vendetta has taken the forms of slow provisioning, failure to turn up customers of resellers, repeated errors in billing or no billing at all."

VNI also claims that while it was waiting for a contract on Option 58, its financial resources were drained.

NOS Communications, Inc., a reseller based in Bethesda, Md., and Affinity Network, Inc., a reseller in Los Angeles, made identical claims.

These allegations could move AT&T into the regulatory gun sights because they question whether AT&T is adhering to some of the most fundamental FCC rules.

If AT&T has engaged in the conduct alleged by the resellers, the carrier would be in violation of the Communications Act of 1934, which includes FCC rules requiring AT&T to allow resale of its services as well as other regulations specifically laid out for Tariff 12 that require the service to be made available to all users.

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WASHINGTON UPDATE

BY ANITA TAFF

FCC criticized for stalling on net reliability. Speaking at the recent ComNet conference, Donna Kwak, president of the Tele-Communications Association, Inc. (TCA), gave the Federal Communications Commission poor marks for protecting network reliability.

Appearing at the Town Meeting session, an annual program that explores major issues in the industry from a variety of viewpoints, Kwak said the FCC's price cap regulation plan has resulted in an erosion of service quality.

Kwak pointed out that, in the last year, the Bell operating companies have reduced their work force by 30,000 positions, with many of those cuts involving senior, experienced employees. "We are getting really young [service] people, and we see the level of quality deteriorating," Kwak said. She noted that, in some instances, TCA members have complained that they have had to teach service personnel how to remedy net problems.

According to Kwak, the BOCs plan to cut an additional 20,000 employees this year.

The FCC has also failed to take appropriate action to guard against future network outages, Kwak said. The TCA has officially complained to the FCC that its proposed plan to require carriers to report outages is inadequate and will overlook all but the most massive problems.

The TCA has said that the FCC erred in naming as head of the effort Paul Henson, a former telephone executive, who the group said is hesitant to allow user involvement. According to a TCA statement, Henson believes that users might jeopardize frank, productive discussions and inhibit the panel's process.

Kwak said service quality is the primary concern — even more important than cost — in some industries such as financial and brokerage firms. She added that it is not necessary for the FCC to set net standards, but that the agency should force local carriers to publish their internal net standards. ◘

"The biggest challenge is meeting the needs of an increasing number of adult learners and using technology to attract the best college students."

▲ ▲ ▲

Paula Loendorf
- President of ACUTA
- Director of communications support services
  University of North Dakota
  Grand Forks

Soaring enrollment strains college nets

ACUTA head details problems net managers face as new and older students' needs expand.

Q&A The sharp downturn in the nation's economy has forced companies large and small to downsize operations in a concerted effort to cut expenses.

Educators estimate that thousands of those left unemployed by downsizing have gone back to school to continue their education or seek retraining in a new profession. The needs of adult learners combined with those of younger students has forced many colleges and universities to offer wider access to educational resources.

Paula Loendorf, president of the Association of College and University Telecommunications Administrators (ACUTA) and director of communications support services for the University of North Dakota at Grand Forks, talked with *Network World* Senior Editor Bob Wallace about issues facing college and university network managers.

What are the top challenges facing college and university network managers today?

The biggest challenge is meeting the needs of an increasing number of adult learners and using technology to attract the best and brightest college students.

We're seeing more and more adult learners in colleges and universities. Statistics show that 50% of today's college students are over 25 years old. Yet, a lot of college and universities still cater to the full-time resident student between 18 and 22.

What we are seeing is that adult learners have a different set of demands. They may not want to live on campus; they may want to stay at home. And they may live in a rural community and want access to education from a metropolitan area. The challenge for telecommunications administrators is to use technology to help their schools meet the needs of adult learners and traditional students.

What kind of technology are ACUTA members looking at to better serve students of different ages?

There is a huge need for electronic access to educational information. They want access to databases and bulletin boards now and will eventually want on-line access to items such as library card catalogs, books and periodicals.

As far as services are concerned, interactive videoconferencing is a must in less populated states. We've established a video network linking all 13 of the higher education institutions in North Dakota. We have classrooms on every campus that can communicate with all the other classrooms in the state on the network. We have 15 classrooms up and running now.

To show you the interest in distance learning, there were over 120 people from various colleges and universities at a recent seminar on the topic. One college sent six people because they thought it was that important.

Do most ACUTA members have public or private networks?

In North Dakota, we've had a statewide private network that was built to handle voice and data traffic. But in the last few years, we have been evolving on the voice side to virtual networks. Competition is forcing the prices

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Resellers charge discrimination

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AT&T denies that it has a grudge against resellers, saying it wanted to discontinue Option 58 because new rules imposed by the FCC would enable users to get out of a contract before the carrier could turn a profit. Option 58, originally designed for PepsiCo., Inc., was structured in such a way that AT&T would lose money in the first year but make it up in the second and third years.

Last fall, the FCC said Tariff 12 users could discontinue their deals without penalty as soon as 800 numbers become portable in 1993. Therefore, if users ordered Option 58 now, they could discontinue it in 1993 after one year of service, leaving AT&T holding the financial bag.

Last year, AT&T tried unsuccessfully to impose a $1.1 million installation charge on new users of Option 58. The FCC rejected the revision because it had prohibited changes to existing Tariff 12 deals in an order issued last August.

All the resellers filing comments last week told a similar tale of AT&T foot-dragging in executing deals. VNI said it has been negotiating with AT&T since early 1991 and was in final discussions on the deal when AT&T filed its request to discontinue selling Option 58. VNI said it was told by the carrier that it was no longer eligible to purchase Option 58.

Telephone Management Corp. (TMC), a consulting firm that orders telecommunications services for resellers, said seven of its clients had ordered service from AT&T prior to Jan. 4. One had received a draft contract, and two others had been promised a contract by the end of January. However, without notice, AT&T filed its request to discontinue Option 58 and said it would not discuss the issue further, according to TMC.

Based on these experiences, all the resellers said that they believe AT&T's request to freeze sales of Option 58 is targeted at them. Also, some observers claim that AT&T officials are unhappy about the resale of Tariff 12 because the resellers skim too much profit from the carrier.

Resellers pointed out that they do not necessarily have any interest in abandoning Tariff 12 next year just because FCC rules would allow them to do so. Those rules are directed primarily at end users, which might want to shop for better or less expensive 800 service once they have the ability to switch their 800 numbers between carriers.

TMC also said AT&T could have used less draconian methods to solve its financial concerns. The firm suggested that the carrier could have raised Option 58 rates 2.5% in order to recoup the anticipated $70,000 to $110,000 in losses during the first year of the deal. ◻

> All the resellers filing comments last week told a tale of AT&T foot-dragging in executing deals.
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> ▲▲▲

Enrollment strains nets

continued from page 13

down. You could actually forget your private tandem network and go with a public one.

But now I'm seeing more states thinking about private networks because not only do they have voice and data, but they also have video, which takes up a huge amount of bandwidth. Even though we in North Dakota are starting to push voice into the public network, we might eventually bring it back again. Combining voice, data and video traffic into one private, statewide network might be most effective for us.

In some states, the carriers haven't been providing the pricing, availability and different kinds of bandwidth in the ways people want. That is changing, but it's changing slowly in many states.

What do ACUTA members make of advanced network services, such as Integrated Services Digital Network, frame relay and Switched Multimegabit Data Service?

We're always holding sessions on these services. We see people beginning to use them, but slowly.

What is the word from ACUTA members on Fiber Distributed Data Interface?

I hear quite a few schools say they are looking at evolving from token-ring networks and backbones to FDDI. What's keeping some back now is the cost of the electronics and uncertainty as to what the standard is. There are definitely colleges and universities that are using it now.

We see some applications for it in segments of our campus, and we know we are going to gradually evolve to it, but equipment costs are holding us back. Once prices for the needed electronics go down, more people will move to it.

Are there any administrative processes that colleges and universities are looking to automate?

There are several. Enabling students to use their telephone with voice response systems to register for classes is happening at many schools. We're just implementing [push-button] registration at North Dakota.

We're also bringing card catalogs on-line. This will be done

Introducing
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Once you only had two choices. Fixed-port hubs that didn't grow. Or expensive chassis-based hubs that did.

LinkBuilder 10BT.

Now there's an alternative. The new LinkBuilder™ 10BT hub family.

No other fixed-port hubs give you such an easy way to grow at such a frugal price.

LinkBuilder 10BT hubs are fixed-port hubs, but they act like chassis-based, modular hubs. You add ports as you need ports. You manage as you need to manage. You grow as you need to grow.

Start with 12 ports in a single LinkBuilder 10BT and keep building. You can connect four of them in all – up to 48 ports – and have them act as a single, logical repeater. Just like a chassis-based hub – without the cost.

Best of all, perhaps, you can turn an unmanaged stack of LinkBuilder 10BTs into a managed stack with astonishing ease.

more and more in the coming months. Many colleges and universities don't even have card catalogs in their libraries anymore.

On our campus, we can access [the card catalog] from offices and residence hall rooms. Our on-line system is used statewide, as well. We think public libraries will want to be part of this big-card-catalog-in-the-sky effort. It will enable people to easily check what's available in the way of books and periodicals at other libraries if their local library can't afford certain literature.

How is electronic mail faring at colleges and universities?

E-mail is a big success. Instead of stopping by professors' offices or calling them on the phone, students are using E-mail. It's widely used by faculty and staff at most campuses.

On-campus systems all connect to national networks like the Internet. This allows you to communicate electronically with people at other schools from a personal computer on a desk.

Do you see any use for wireless communications technologies such as personal communications networks (PCN) at schools?

I'm certain that PCN will do well at colleges and universities across the country. Although you save on the cost of wiring, the cost of the equipment needed to support wireless services is high. It has to go down quite a bit for PCN to flourish. I'm starting to hear about PCN at our meetings but don't know of any schools that are experimenting with PCN now.

Are more schools adding telecommunications degree programs in addition to existing computer science offerings?

Yes. Too often the degrees have been in computing, and many computing degree programs don't deal with telecommunications and networking, which is pretty amazing. If people graduate with a computer science degree and have to learn about telecommunications management on the job, it gets tough. I don't think people that know telecommunications and networking have a hard time picking up knowledge of computers.

Do you think existing telecommunications degree programs are keeping up with the industry and emerging techologies?

There are some telecom programs out there that are really just technically oriented, while others have a much broader scope in which you study political, societal and management issues.

The technology is definitely important, but telecommunications administrators have to be much more than technicians. They need to be generalists with a good understanding of business and marketing and the needs of the company or organization for which they work. So any program that focuses too much on technology is shortsighted. Administrators need to develop management skills.

> "The technology is important, but telecom administrators have to be more than technicians."
>
> ▲▲▲

It's hard to tell if programs, as a whole, do a good job of [teaching] emerging technologies. It depends on the school, the funding they have and the available resources.

Some of the schools are proactive in working with corporations to create training laboratories that enable students to get hands-on experience with the latest and greatest technologies. But there are other schools that just don't have the resources to put emerging technologies in front of their students.

How do college and university telecommunications managers differ from people in the same post at large corporations?

One way we differ is that we are nonprofit organizations. Our clientele is different. Students pay to come to your school, and part of what attracts them is the types of access they have from the residence hall or the classroom to the best technology available.

Are there any particular skills that an ACUTA member may need that may not be required by a network manager at a large corporation?

I don't know that there are any specifically different skills. Any network manager needs to have the same sorts of technical skills and the ability to be leaders, not just managers. They have to be solution-oriented as opposed to task-oriented.

How do colleges and universities gain a competitive edge in your business?

I think of it as providing access to anything, anytime, anywhere. In order for colleges and universities to attract the best faculty, staff and students, they must be able to offer this access. Faculty, staff and students want to know what facilities the school has available to reach the educational resources they need. ◘

Loendorf will soon be leaving the University of North Dakota at Grand Forks to become the telecommunications manager for the Unversity of Arizona in Tuscon.

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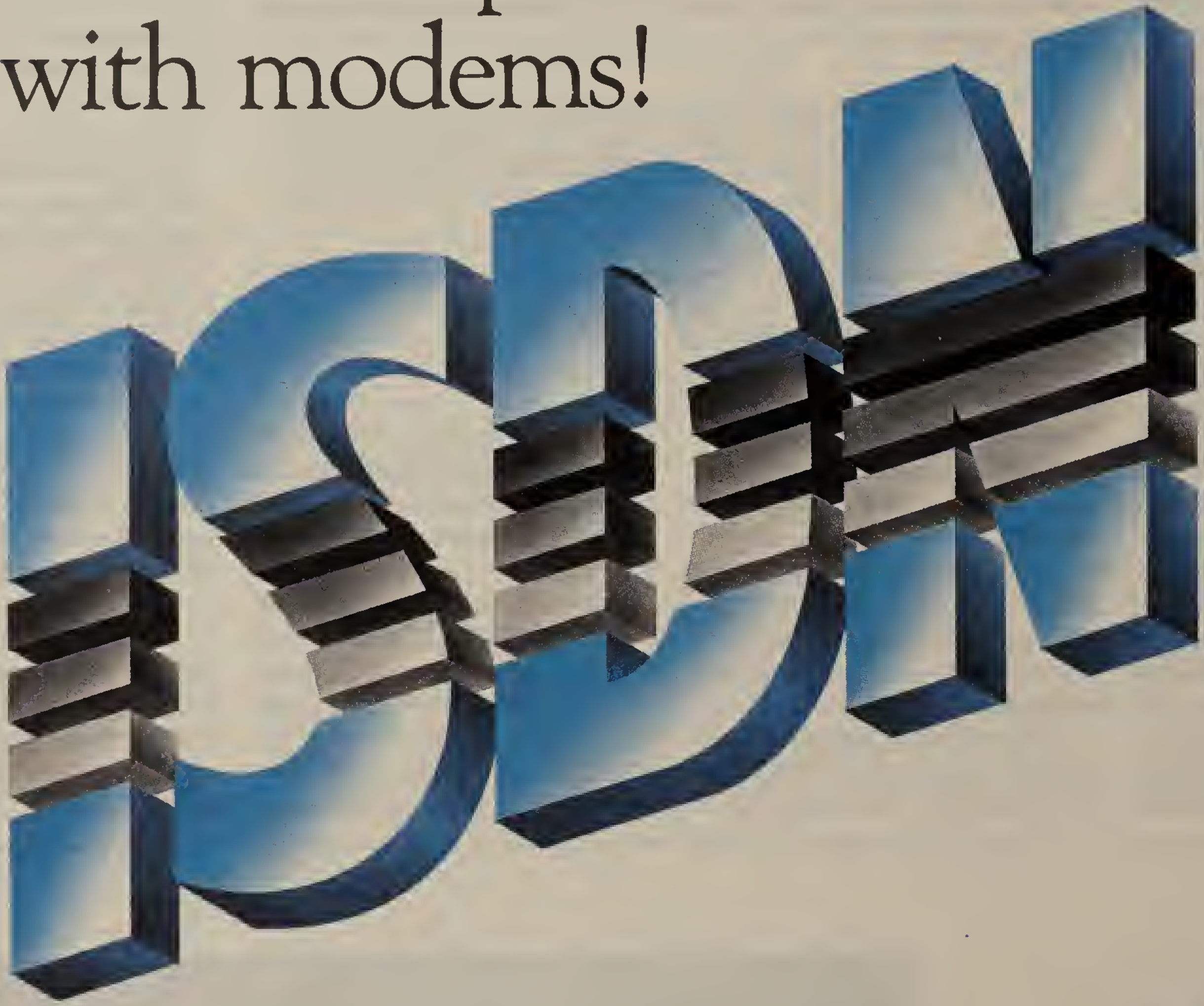

	TA120	TA220	TA/DL	NT100
Basic rate terminal adaptor	●	●	●	
U-Interface NT1				●
V.120 and T-Link protocols	●	●	●	
D-channel X.25 PAD	●	●	●	
17-button keypad	●	●	●	
Supports voice and data	●			
Data only		●	●	
Supports up to five telephones	●			
Single terminal port	●		●	
2 to 4 terminal ports		●		
Software downline loadable			●	
Supports 2B1Q line encoding				●

Engineering expertise, world-class U.S. manufacturing quality and an extensive product line have made UDS the market share leader in high-speed modems for three consecutive years. Now UDS brings this demonstrated leadership to the world of digital data communications.

UDS now offers three terminal adapters and an NT1 network termination unit. These devices, when connected to your local ISDN subscriber loop, can bring rates up to 64,000 bits per second to your desktop. Both AT&T and Northern Telecom switches are supported. And UDS quality is built into each model. The table at left summarizes the family.

For full details and pricing, contact UDS at:

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Worth Noting

> "SNA is routable — you just have to know how to do it."
>
> **John Hunter**
> Director of architecture and telecommunications
> IBM Networking Systems
> Research Triangle Park, N.C.

Data Packets

Ascom Timeplex, Inc. last week announced that its ISDN Gateway Server (IGS) now supports automatic number identification and AT&T's switched 384K bit/sec service. The IGS connects devices not equipped for Integrated Services Digital Network access, such as private branch exchanges, to Primary Rate Interface lines.

The IGS is priced between $15,000 and $60,000, depending on model and configuration.

Ascom Timeplex also announced a comarketing agreement with AT&T under which the carrier will resell the IGS.

Digital Access Corp. of Reston, Va., and **Niwot Networks, Inc.** of Boulder, Colo., recently announced the integration of their respective products to support file and image transfers of up to 1.3M bit/sec over high-speed switched circuits.

Digital Access' Fracdial inverse multiplexer will work with Niwot Networks' AT/SD synchronous communications board to enable stand-alone AT bus-compatible personal computers or servers to transfer large files over multiple switched 56K bit/sec links.

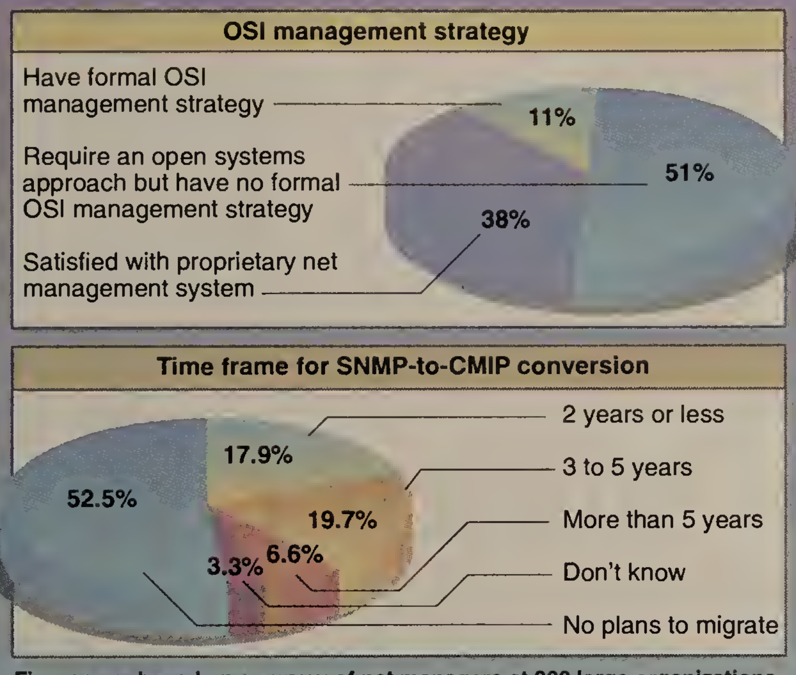
Fracdial synchronizes the switched calls on each end to form a single, logical bandwidth pool. The switched services must be accessed via a full T-1 line.

Users can configure the system to support automatic, unattended file transfers.

Both products are available now.

Fracdial ranges in price from $6,995 to $11,500, while the AT/SD costs $2,200, which includes hardware and software.

Users in no rush for OSI management



Figures are based on a survey of net managers at 200 large organizations.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

GTE Spacenet announces low-cost VSAT product line

Includes antennas, hubs, net management wares.

By Bob Brown
Senior Editor

MCLEAN, Va. — GTE Spacenet Corp. recently introduced new low-cost VSAT satellite network products designed for retailers and other users that need to support moderate transactional data traffic at hundreds of sites.

The Skystar Advantage product line comprises new very small aperture terminals featuring submeter antennas, a new private hub and new network management software that will cost users as little as $200 a month per site. That price is comparable to that of dial-up terrestrial services, company officials said.

There is no limit to the number of sites that can be supported by one of GTE Spacenet's new configurable hubs, although the hubs are best suited to support at least 500 sites, a company spokeswoman said.

The hubs and VSATs are designed to handle two-way communications at 9.6K bit/sec and support X.25, asynchronous and Synchronous Data Link Control protocols. The products will be upgraded to support other protocols based on customer demand.

GTE Spacenet joins Hughes Network Systems, Inc. and other VSAT makers in offering low-cost VSATs in hopes of expanding the market. VSAT satellite products, such as GTE Spacenet's Skystar Plus, are designed for users with heavy data traffic requirements to replace multidrop terrestrial lines, which typically cost at least $300 a month per site.

"We're primarily targeting customers who have been unable to adopt VSAT technology due to the cost trade-offs," said Jim MacDonald, vice-president of network services at GTE Spacenet. "We've been able to broaden the addressable market with this service."

According to MacDonald, GTE Spacenet is targeting user sites with highly interactive data needs, including chain stores and gas station-convenience store combinations.

GTE Spacenet worked with Gilat Communication Systems, Ltd., an Israeli firm, for more than a year to build the components of Skystar Advantage, MacDonald said. The new VSATs are not only more compact and equipped with a smaller Ku-band antenna, but also feature new electronics and software.

The Skystar Advantage Network Management software runs on a Sun Microsystems, Inc. SPARCstation and lets the net manager monitor and control the network from a single site.

While priced comparably to a terrestrial network, Skystar Advantage offers additional benefits of high network reliability and support for other applications, such as broadcast data and video, MacDonald said.

GTE Spacenet has implemented Skystar Advantage networks at two user sites, but MacDonald declined to name them.

The company is working in conjunction with National Data Corp., an Atlanta-based credit verification service company, at those customer sites.

Group to explore X.500 for Internet

Task force to propose software and guidelines for using X.500 to ease routing of X.400 E-mail.

By Wayne Eckerson
Senior Editor

ARDEN HILLS, Minn. — The Internet Engineering Task Force (IETF) has formed a group that plans to issue guidelines and software for using X.500 directory services to route messages on the Internet.

The guidelines and software are expected to spur usage of X.400 messaging on the Internet by significantly reducing the administrative burden of maintaining X.400 routing tables and providing routing information for unlimited Internet nodes.

"This will allow X.400 usage to scale up rapidly on the Internet," said Kevin Jordan, senior software engineer at Control Data Corp. here and cochairman of the newly formed Message Handling System-Directory Services (MHS-DS) working group.

The MHS-DS guidelines will define how X.400 message transfer agents can obtain routing information from remote X.500 directories and dynamically route X.400 messages to their destination.

Currently, local network administrators periodically download X.400 routing information from a central repository within their country to their own network, Jordan said. To minimize overhead, the repositories do not contain routing information for individuals and only specify a single X.400 node within an organization. The tables are only updated about once a month.

The drawback to this approach is that the routing data rapidly becomes obsolete and is often incompatible.

According to the MHS-DS group, it plans to propose a setup that will eliminate the need for local administrators to download and maintain routing tables. Instead, the group will establish global X.500 directory nodes on the Internet that will contain X.400 routing information for every person and X.400 node within the organization.

This setup will not only make it easier for administrators to support X.400 messaging, but will also make routing information available for a greatly expanded number of X.400 nodes. As a result, X.400 messages will be able to take more direct routes to their destination, passing through fewer nodes.

All routing information will be up-to-date since any change that an administrator makes to a publicly authorized local directory will be automatically available to all Internet users.

(continued on page 18)

Firms team on distributed computing mgmt. tool

By Jim Duffy
Senior Editor

SAN FRANCISCO — Unix Systems Laboratories, Inc. and Tivoli Systems, Inc. recently announced they will develop a systems and network management product for the Unix System V operating system that will enable users to manage distributed computing environments. The product will interoperate with the Open Software Foundation, Inc.'s (OSF) Distributed Management Environment, the firms said.

The software, which will include an object request broker and a set of programming interfaces, will be based on Tivoli's WizDOM object-oriented software for Unix that manages systems, hard disks, printers, modem pools and other resources. Users can develop applications on top of WizDOM that allow network administrators to set up, change and manage system and network resources, the companies said.

WizDOM has been endorsed by Unix International, Inc. as a reference technology for UI-Atlas, the company's distributed computing environment, as well as by OSF. The product resulting from the Unix Systems-Tivoli effort will be included in UI-Atlas.

NetLabs, Inc., Siemens Information Systems, Inc. and Tivoli will provide Unix-based systems and network management applications that will work with the Unix Systems-Tivoli product.

The new software will be available early next year, the companies said.

Bevy of wireless data networking products emerge for corporate use

Radio modems let portable computers tie into company nets.

By Jim Duffy
Senior Editor

WASHINGTON, D.C. — The recent ComNet show here was the scene of several product announcements aimed at easing the task of tying various devices into corporate networks via wireless wide-area networks.

At the show, Ericsson GE Mobile Data, Inc. announced Mobidem, a portable wireless modem, while Microcom, Inc. and Mitsubishi International Corp. demonstrated an integrated cellular telephone and modem. Additionally, Simware, Inc. announced software that lets personal computers establish IBM 3270 sessions over wireless data nets.

Mobidem will allow users to access wireless data networks from palmtop, notebook and laptop computers. It is designed for use with the Mobitex public wireless packet-switched network operated by RAM Mobile Data in 30 cities in North America. RAM Mobile intends to offer service in 100 markets by 1993.

Mobidem supports two-way data communications and can be connected to any PC that has an RS-232 serial port. It operates at 8K bit/sec and scans the network for incoming messages, storing them in its internal buffer even when the connected PC is turned off.

"We're seeing a lot of interest in the E-mail community," said Bill Frezza, director of marketing and business development at Ericsson GE. "We think Mobidem will be a real boon for public E-mail."

Users can purchase Mobidem as part of an electronic mail package called Viking Express. Developed for use with Hewlett-Packard Co.'s 95LX palmtop, Viking Express also includes an E-mail gateway that connects the Mobidem and RAM Mobile Data Network, a joint venture of RAM Mobile and BellSouth Corp., to public and private local-area network-based E-mail systems.

Mobidem is priced at $1,795 and will be available by the end of the first quarter.

Also at ComNet, Microcom and Mitsubishi International demonstrated the Cellular Data Link, a Mitsubishi cellular telephone with an integrated Microcom modem. The product combines a Mitsubishi Model 1500 cellular phone with a 9.6K bit/sec Microcom MNP 10 modem.

Laptop and other computers can be plugged into the phone and use the customer's cellular service to transmit data. The product ranges in price from $1,199 for a model supporting dedicated data usage to $1,899 for a voice/data capable unit.

> Mobidem will allow users to access wireless data networks from palmtop, notebook and laptop computers.
>
> ▲▲▲

In addition, Simware, an Ottawa-based developer of IBM mainframe connectivity software, announced an application that allows computers to establish 3270 terminal sessions with IBM mainframes over wireless networks. Simware's SplitSecond RF application works with Ericsson GE's Mobidem and the Mobitex network from RAM Mobile Data.

Last week, Simware also announced a comarketing agreement with ARDIS Co., under which both companies will sell Simware's software for use on the ARDIS wireless data network. ARDIS is a joint venture of IBM and Motorola, Inc.

Group to explore X.500 for Internet

continued from page 17

The IETF X.400 Operations Working Group established the MHS-DS group to expedite the integration of X.400 and X.500 services in response to users' needs, Jordan said. In Europe, where X.400 usage on the Internet is much greater than that in the U.S., electronic mail administrators have complained that national repositories are becoming too large and unwieldy to maintain and download.

The group has been meeting for more than a year to hammer out conventions for operating X.400 services on the Internet. Jordan said he expects the MHS-DS group will quickly define the guidelines for integrating X.400 and X.500 services and spend most of its time augmenting existing X.500 software to perform X.400 lookups on the Internet.

By the time the IETF issues a standard based on its guidelines — perhaps as soon as the end of this year — the MHS-DS group will be ready to issue publicly available software to the Internet community, he said.

I've read we'll be smarter in the future. Which is great. Except I need my terminal to be smarter in the present.

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HOW DOES THAT GADGET WORK AGAIN, RAY?
IT'S SIMPLE... THE OSMO-RAY DISPLACES THE MOLECULES OF SOLID MATTER...A BABY COULD DO IT!!

So I called Xyplex. They showed me their new 1600 Terminal Server. It's the intelligence behind my terminal. Now *and* when my network grows and changes. What's so great is that the 1600 has expandable memory – up to 5 Mbytes (using low cost SIMMs). I can start with LAT and TCP/IP and add TN3270 whenever I want. Xyplex made it a simple software upgrade. I can load software from the memory card or from the network. And with Xyplex's software configuration tools, I can easily tailor the 1600 to meet my requirements. Like linking users to IBM mainframes, giving PCs access to UNIX and VMS computers, or even connecting data collection and process control devices to the network.

For remote users, the 1600 has modem and hardware flow control. For security, there's dialback and Kerberos, the user authentication and password encryption system developed by MIT.

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Wherever you go, you won't miss any connections with the DECpc 320P Notebook. That's because the 320P comes *standard* with a 2400 baud modem so you won't get behind in answering your MCI

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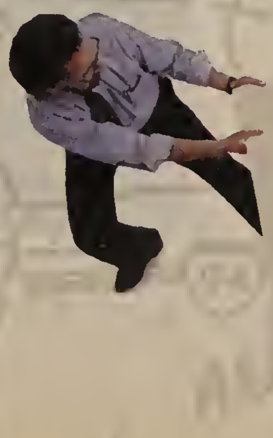

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Storage:	52MB IDE Hard Disk Drive 3.5″ 1.44MB Floppy
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Display:	14″ Multi-sync VGA Color Monitor
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Includes:

Microprocessor:	Intel i386 running at 25MHz
Memory:	4MB, 80ns Memory Kit
Storage:	52MB IDE Hard Disk Drive 3.5″ 1.44MB Floppy 1.2″ dd Floppy
Resolution Mode:	1024 X 768 SVGA Adapter
Display:	14″ VGA Color Monitor
Keyboard:	101-key Keyboard
Mouse:	Three-button Mouse
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

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Display:	TST Backlit VGA
Modem:	2400 bps Data
Keyboard:	84-key Keyboard
Mouse:	Logitech TrackMan Portable
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0 (factory installed)

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Storage:	52MB IDE Hard Disk Drive
Resolution Mode:	1024 X 768 SVGA Adapter
Display:	14″ Multi-sync VGA Color Monitor
Keyboard:	101-key Keyboard
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☐ The DECpc 320P Notebook
☐ The Catalog

Customization Worksheet

Your base system is a: ☐ 286 ☐ 386 ☐ 486 ☐ Other

How many applications will your PC(s) run in a typical workday?________

What best describes the type of work the system will be used for? (Check all that apply):

☐ Word Processing
☐ Order-entry
☐ Database (filing records)
☐ Financial Calculations
☐ Retail Store Management
☐ Desktop Publishing
☐ Education
☐ Design (CAD/CAM)
☐ Engineering
☐ Industrial Process Control
☐ Scientific Research
☐ Software Development
☐ E-Mail
☐ Other industry-specific applications (please specify)

How many people work in your group, department or small business?
☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:
☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX™ ☐ Other

Which of the following graphics-oriented applications best describes your needs? (Check all that apply)

☐ Desktop Publishing
☐ CAD/CAM
☐ Realtime Modeling
☐ Animation
☐ Image Processing
☐ AutoCad
☐ Business Graphics

LAN Communication

How many PCs do you have installed?________ From how many manufacturers?________

What kinds of connections does your PC(s) require? (Check all that apply)

☐ Links with other PCs in the immediate surroundings
☐ Connection to the local area network (LAN) throughout a building
☐ A line to a host system in a remote location

What kind of media (cable) is used in your LANs today?________

What is the networking software now being used in your company?________

What kind of host system will your PC communicate with?
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Worth Noting

"I really believe imaging will be the new data type of the '90s."

John Edwards
Director of marketing
NetWare Products Division
Novell, Inc.
Provo, Utah

Netnotes

Hewlett-Packard Co. recently extended its Network Advisor family of net management products with the addition of the HP 4983A FDDI network advisor and the HP FDDI net interface module.

The Fiber Distributed Data Interface network advisor complements the existing Ethernet, token-ring and wide-area network advisor modules for the Network Advisor, a self-contained network analysis tool. These are rules-based expert system hardware/software pieces that, when used together, help administrators with troubleshooting of their heterogeneous networks.

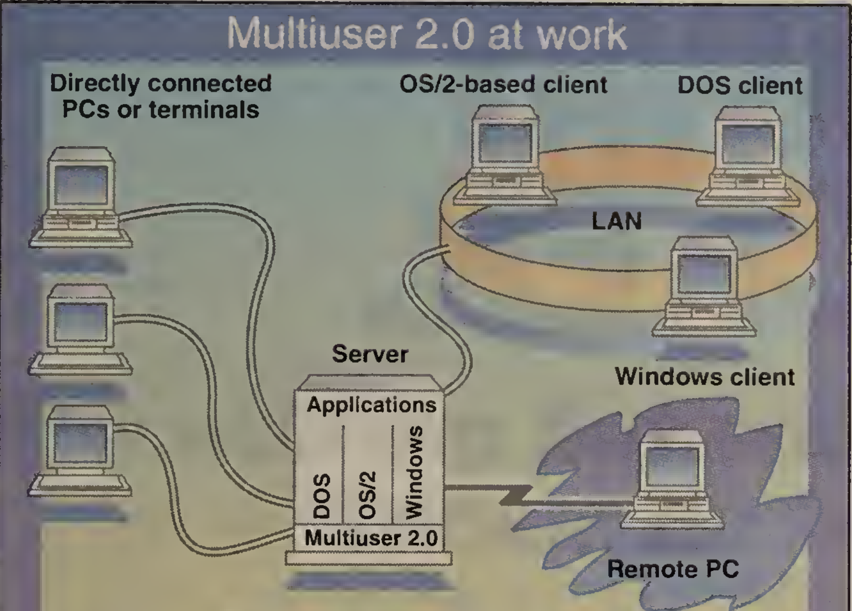
The FDDI module includes HP's fault finder capabilities, which let users focus on the symptoms of network problems rather than relying on their interpretation of protocol traffic.

According to the company, because the system is rules-based, the module can take its own findings, develop hypotheses and perform measurements until a conclusion or recommended solution is reached.

The HP FDDI network advisor and interface module are expected to be available this summer. According to HP, prices are not expected to exceed $45,000 for the HP FDDI network advisor and $35,000 for the HP FDDI network interface module used to upgrade existing HP Ethernet and token-ring network advisors.

Digital Communications Associates, Inc. last week added two new software drivers to its Irmatrac Token-Ring Adapter Convertible network adapters — one for No-

(continued on page 28)



Version 2.0 of Multiuser, a multitasking operating system, can simultaneously run DOS, OS/2 and Microsoft Corp. Windows applications and provide users in a variety of environments access to these programs.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: CITRIX SYSTEMS, INC., CORAL SPRINGS, FLA.

Multiuser to support DOS, OS/2, Windows applications

Version works with VINES, NetWare, LAN Server.

By Caryn Gillooly
Senior Editor

CORAL SPRINGS, Fla. — Citrix Systems, Inc. this week is expected to introduce the next version of its Multiuser operating system, which can simultaneously support DOS, OS/2 and Microsoft Corp. Windows applications. Previously, Multiuser could only support OS/2-based applications.

Citrix Systems' Multiuser 2.0 is a 32-bit operating system for Intel Corp. 80386- or 80486-based machines that can be used as an application server for DOS-, OS/2- and Windows-based clients in a mixed local-area network environment. The product is compatible with Banyan Systems, Inc. VINES, IBM LAN Server, Microsoft LAN Manager and Novell, Inc. NetWare LANs.

Users can also attach dumb terminals or low-end personal computers to the Multiuser server as a low-cost extension to existing LAN environments and let remote users dial in to executive applications. For smaller environments, users can attach terminals and PCs to a Multiuser server in order to create a virtual LAN.

"Novell lets you share files, but we let you share a CPU," said Ed Iacobucci, chairman of Citrix Systems, based here, referring to the advantages of application servers. "On a NetWare LAN, you have to download the application to the workstation and run it there, but often, people on the network with small machines can't run applications locally."

Multiuser is like Unix in that it is a multiuser, multitasking operating system. Unlike Unix, however, the system provides a more familiar DOS-like environment and can serve different clients with various types of applications.

In order to implement Multiuser as an application server for NetWare, LAN Manager, VINES or LAN Server environments, Citrix Systems' Multiuser LANLink software must be installed on the target client devices. LANLink is a terminal-emulation program through which the client uses a direct LAN connection to communicate with the server.

Once connected, the user can execute any application. But unlike other LANs, the application is executed on the server rather than on the client.

> "Novell lets you share files, but we let you share a CPU," Iacobucci said.
>
> ▲▲▲

According to the company, the amount of users that can log on to a Multiuser server and the number of applications that can run simultaneously depends on the power of the server, the amount of memory installed, and the number and type of applications resident.

For example, Citrix Systems' own network is based around Multiuser. The software runs on a 33-MHz, 80486-based machine with 32M bytes of memory. The

(continued on page 28)

Banyan pares VINES for small user nets

Vendor to offer net software in 5-, 10- and 20-user configurations to replace VINES Team offering.

By Timothy O'Brien
West Coast Bureau Chief

WESTBOROUGH, Mass. — Banyan Systems, Inc. today plans to unveil three entry-level versions of its VINES local-area network operating system suited for work groups of as many as 20 users.

Repackaging VINES makes it more affordable for users with small work groups or remote offices to install the network operating system than the unlimited-user license Banyan also offers.

In some ways, the new VINES packaging is an effort to offset the limitations of VINES Team, a 10-user version of the software designed for use in remote offices. VINES Team has been hampered by the fact that Banyan did not support a LAN-to-LAN software option, a fact that restricted users to a single server on the LAN.

Banyan's new VINES 5, 10 and 20 support the option, enabling users to support server-to-server communications, either at a remote site or in a small work group attached to a larger VINES net.

"Although there might be fewer people to connect, these organizations often have the same complex computing and networking requirements of Banyan's traditionally larger VINES customers," said James D'Arezzo, Banyan's vice-president of marketing.

The vendor will offer 5-, 10- and 20-user versions of all current releases of VINES, including 4.10, its latest international release; VINES 4.11, which added more platform and peripheral support; and VINES 5.0, which offers Apple Computer, Inc. Macintosh support and other new features.

Banyan is expected to bring all versions back together into a single release called VINES 5.1, which is expected sometime later this year.

Just like the unlimited user version of VINES, the vendor's new VINES 5, 10, and 20 versions offer basic file and print services, as well as the StreetTalk global di-

(continued on page 27)

Network General adds IPX to the Distributed Sniffer

By Caryn Gillooly
Senior Editor

MENLO PARK, Calif. — Network General Corp. last week added support for Novell, Inc.'s Internetwork Packet Exchange (IPX) to its Distributed Sniffer System (DSS), a client/server-based network monitoring and analysis product.

With the additional support, administrators will be able to use DSS to analyze and monitor Novell's NetWare-only networks connected with IPX routers, regardless of whether the respective networks are based on Ethernet or token ring.

DSS is similar to Network General's flagship Sniffer Network Analyzer product in that it decodes protocols and provides network traffic analysis. But unlike the self-contained Sniffer, DSS comprises client and server components.

In a large corporate network, for example, a customer would use a DSS server on various network segments to collect data for local analysis. The central administrator, however, has the ability to poll the servers and view the status of each of these segments through Network General's SniffMaster Console.

Before this release, DSS could only analyze and decode Transmission Control Protocol/Internet Protocol and IBM's Network Basic I/O System Extended User Interface (NETBEUI) protocols and traffic. DSS was designed specifically for larger Ethernet-based and IBM Token-Ring-based networks.

Therefore, users with IPX-based NetWare segments could not analyze those segments using DSS, and DSS information could not pass through IPX-based routers. In addition, because TCP/IP and NETBEUI are Ethernet- and Token-Ring-centric, respectively, the administrator could not see into both environments using one SniffMaster Console.

"The irony of our first DSS release was that we are a Novell

(continued on page 28)

Nightmare Scenario #2

THE RUNAWAY CASH SUCKER.

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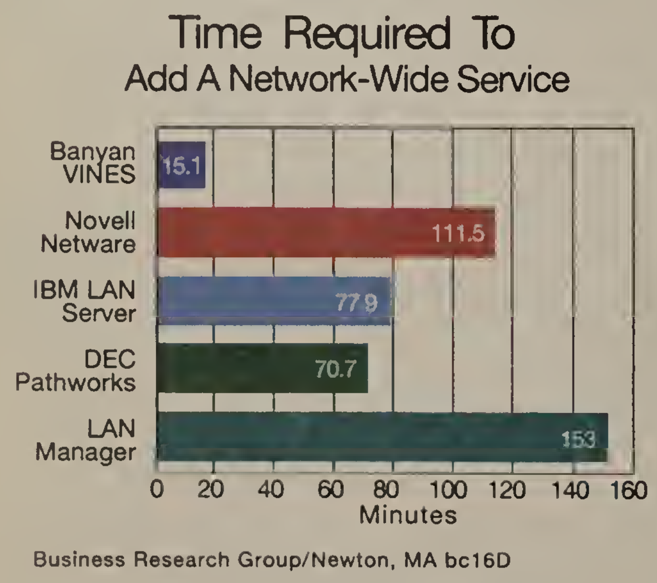
It was compiled by the Business Research Group, and shows how Banyan, Novell, IBM, DEC, and Microsoft stack up against each other in cost of operation.



Business Research Group/Newton, MA bc16D

For sheer cost-effectiveness, Banyan surpasses everyone.

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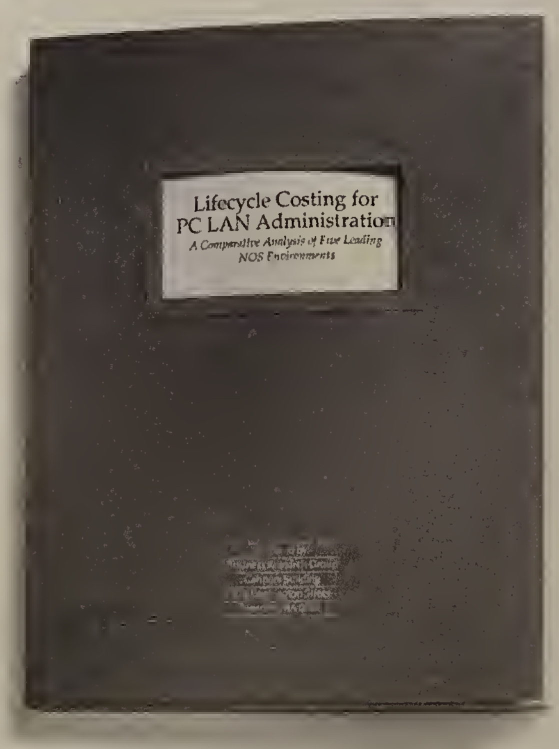

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Novell unwraps new entry-level, mid-range versions of NetWare

By Timothy O'Brien
West Coast Bureau Chief

PROVO, Utah — Novell, Inc. last week unveiled five- and 50-user versions of its NetWare Version 3.11 network operating system, making it more affordable for some users to employ entry-level and mid-range versions of the software.

With 10-, 20-, 100- and 250-user versions of NetWare 3.11 already available, Novell designed the two new packaging options to give users more flexibility in tailoring NetWare installations to meet their needs.

The releases also offer users lower cost configuration options to migrate from NetWare 2.X to the more powerful NetWare 3.11.

"These new products make it more affordable for customers to purchase a network operating system that meets their current and future networking needs," said John Edwards, director of marketing for Novell's NetWare Systems Group.

Both the five- and 50-user configurations offer the same interoperability and functionality as the other NetWare 3.11 versions. This includes features such as disk duplexing, read-after-write verification and disk mirroring.

With the new five-user configuration, Novell is targeting small businesses and remote branch offices that require the full functionality of NetWare 3.11 rather than NetWare 2.X or Novell's new peer-to-peer LAN offering, NetWare Lite.

The 50-user configuration provides an additional mid-range price point for users who require NetWare 3.11, but who have fewer than 50 users and do not wish to pay for the 100-user version.

One reason behind the move to further stratify the NetWare product line is to accommodate many current Novell customers that are finally beginning to migrate from NetWare 2.X to NetWare 3.11.

In fact, Novell claims that since NetWare 3.11 came out, more than 90% of sites with 50 to 100 users using NetWare 2.X have shifted to NetWare 3.11.

Because these two major releases of NetWare employ different approaches at the file structure level, there are some basic incompatibilities between the add-on applications and products for the two versions.

As a result, Novell is putting its emphasis on Netware 3.11 and looking for new ways to make it easier for its customers to make the move.

The five- and 50-user versions of NetWare will begin shipping immediately. Pricing for the five-user version is $1,095, while the 50-user version costs $4,995.

The pricing for the other versions has not changed and is $2,495 for 10 users, $3,495 for 20 users, $6,995 for 100 users and $12,495 for 250 users.

In addition to introducing the new versions of NetWare, Novell also adjusted its pricing for its high-end NetWare 2.X products. A 50-user version of NetWare 2.X now costs $3,495, instead of $3,995, and a 100-user version now costs $5,495, reduced from $5,995. ◼

Banyan pares VINES for small user nets

continued from page 25

rectory service, multiple levels of security, local- and wide-area communications, messaging and time synchronization.

In addition, because the new versions offer the same functions, installation and administrative features as Banyan's unlimited-user versions, users can upgrade as their needs change without having to adapt to a new version.

To entice users, Banyan has included at no extra charge with VINES 5, 10 and 20 its VINES PC Network Printing, which normally costs $495. PC Network Printing goes beyond the standard server-based printing capability and enables users to access printers that are attached locally to personal computers connected as nodes on the LAN.

Analysts said the introductions are a necessary tactical step for Banyan.

"Banyan had to find a way to address the smaller sites of their large customers," said Kevin O'Neill, vice-president of the Business Research Group in Newton, Mass. "With these new products, they have nicely leveraged the features of VINES."

The new low-end VINES versions will almost double the number of resellers offering the software.

Banyan's traditional high-end network integrators will also offer the entire product line but most will likely continue to focus on the larger network integration opportunities.

Pricing for the new products is $1,295 for VINES 5, $2,495 for VINES 10 and $3,995 for VINES 20. For a fee that varies according to the version, Banyan will be offering its current VINES subscription program for the new packages. This program gives VINES customers 12 months of minor releases and updates as well as the opportunity to purchase major software upgrades at discounted prices.

Pending orders for VINES Team will be filled with VINES 10. ◼

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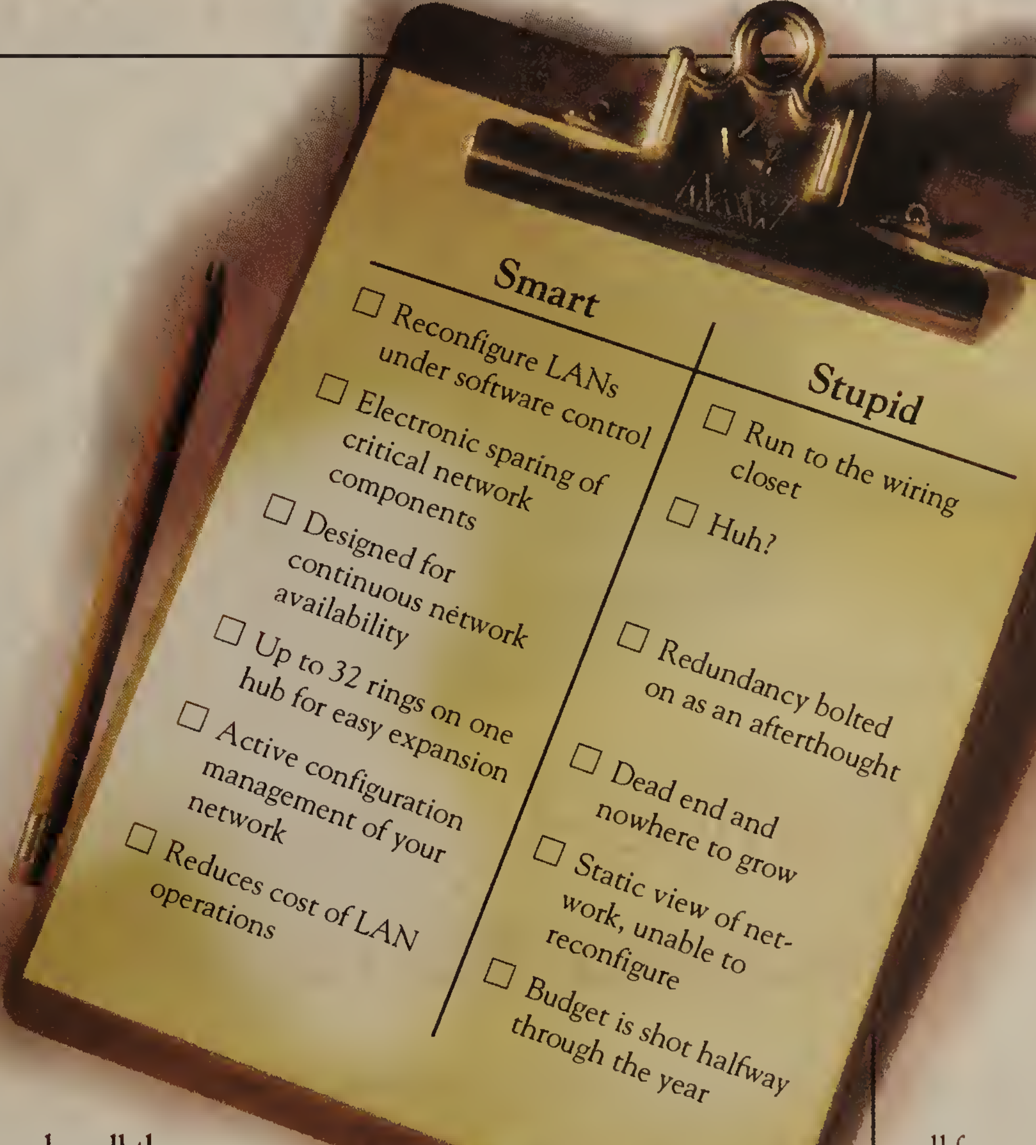
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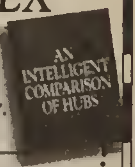

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Multiuser to support DOS, OS/2, Windows

continued from page 25

server houses five main applications: Lotus Development Corp.'s cc:Mail and 1-2-3, Borland International, Inc.'s Paradox, WordPerfect Corp.'s WordPerfect and Microsoft's Word. According to the company, there are about 35 users executing any number of these applications simultaneously.

Multiuser also offers security and administration utilities. For instance, the system has built-in features that enable an administrator to create security classes for users — either administrator, operator, user or guest status — and to grant or deny access to particular files, directories and devices.

The utilities included with Multiuser 2.0 let the administrator monitor resource usage, log events and manage user profiles.

Multiuser 2.0, which will be available next month, costs $995 for a five-user package. Users can buy Citrix Systems' Multiuser 2.0 Doubler for $495, which doubles the number of users regardless of the number already on the system. An add-on for an unlimited number of users is priced at $1,995.

Multiuser LANLink is available now for $199 per node. Multiuser Link, software for remote devices dialing in to access a Multiuser server, is available now and is priced at $149. ◘

Network General adds IPX to Sniffer

continued from page 25

shop," said Bruce Fram, manager of product marketing at Network General, based here. "We couldn't use DSS. We initially introduced it for large high-end networks."

Fram said the company also has a token-ring backbone and Ethernet local-area networks, so even if the company used protocols that DSS supported, the administrator would still have to use two separate consoles.

With IPX support, administrators will now be able to place a DSS server on an IPX-based NetWare segment and have that information pass through the NetWare server and any IPX routers to the SniffMaster Console. Because IPX is often used with both Ethernet and token ring, the product will be able to see into both environments.

Network General has also added a new paging feature to DSS. According to Fram, if DSS creates an alarm, the system will automatically page the administrator and provide basic information, such as which segment is having the problem and the severity of the problem. With this information, the administrator can then decide whether the problem requires immediate attention.

DSS with IPX support and paging capabilities will be available next month at no additional cost to current customers. It will be available to new users at the same price as the previous DSS version. DSS ranges in price from $4,995 to $10,995, depending on its applications and configuration. The SniffMaster Console, which consists of an adapter board and software, costs $7,995. ◘

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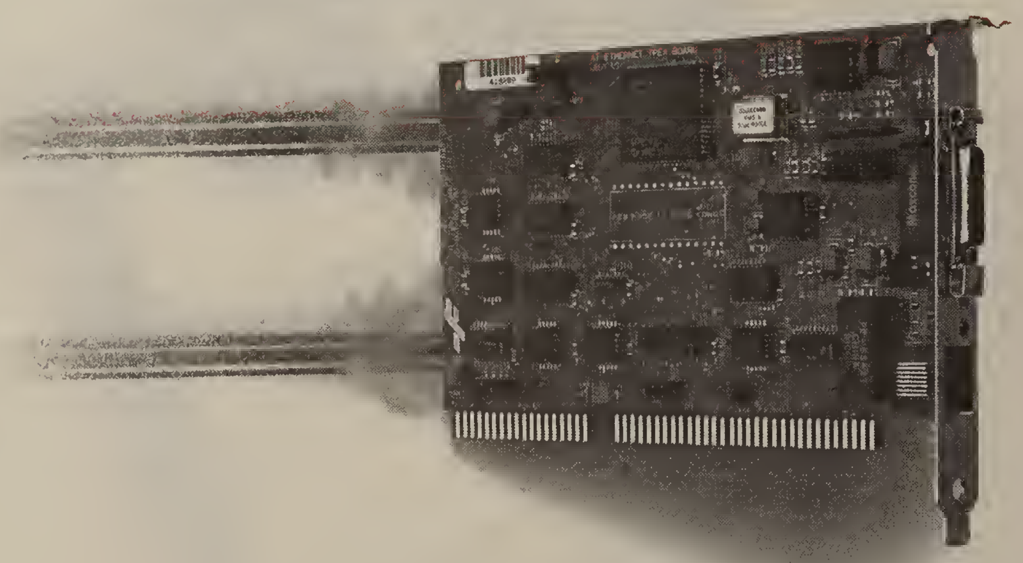

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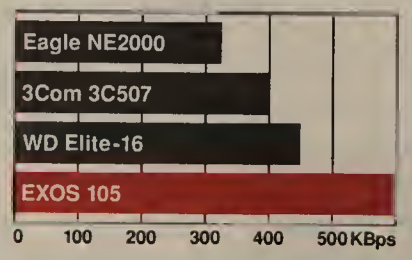

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Circle Reader Service #107

Netnotes

continued from page 25

vell, Inc's. NetWare OS/2 and the other for IBM's OS/2 Extended Edition.

According to DCA, based in Alpharetta, Ga., the new OS/2 Extended Edition drivers let users with OS/2 Extended Edition-based personal computers use Irmatrac to access a variety of host environments, while the Irmatrac NetWare drivers will give users with OS/2 workstations full support of the NetWare OS/2 requester.

The new drivers will be generally available in April for $895. In March, the OS/2 Open Driver Interface drivers will be available at no charge for existing Irmatrac customers on DCA's bulletin board.

Separately, the company also introduced Irma Workstation for DOS (IWD), 3270-emulation software for PCs that supports multiple hardware platforms and a range of connectivity types. The new software package is basically a conglomeration of several of DCA's previously separate products, including E 78 Plus, the Irmax DFT, Irmalan StandAlone Workstation and the Irma Remote line. It supports DCA's Irma hardware adapters in addition to IBM's MultiProtocol Communications Adapter and IBM's coaxial and Token-Ring adapters.

With one product, users can now support multiple connectivity options, including control unit terminal for single-session communications with an IBM mainframe; distributed function terminal for multiple sessions; Synchronous Data Link Control; bisynchronous and Hayes Microcomputer Products, Inc. AutoSynch for remote communications; and IBM Token Ring.

IWD, available now, costs $425. Users of other 3270-emulation software can upgrade to IWD for $95 by sending their existing software to DCA.

FTP Software, Inc. of Wakefield, Mass., recently announced the availability of its *Interoperability Guide*. The reference book gives network administrators a general overview of the Transmission Control Protocol/Internet Protocol and outlines methods for connecting personal computers with several operating systems using TCP/IP. The book also highlights the evolution of TCP/IP and provides general networking background information.

To receive a free copy of the guide, call FTP at (617) 246-0900. ◘

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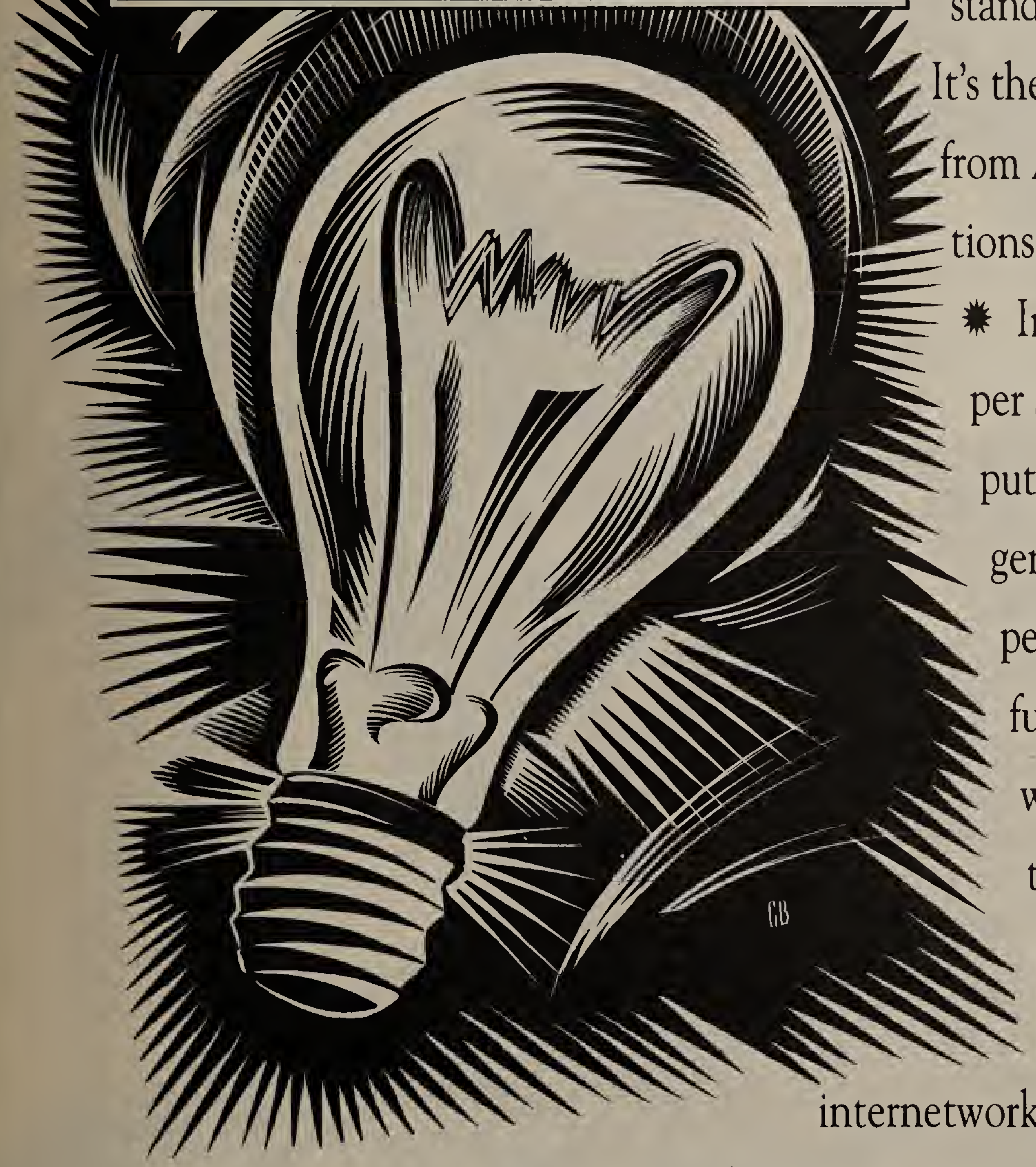

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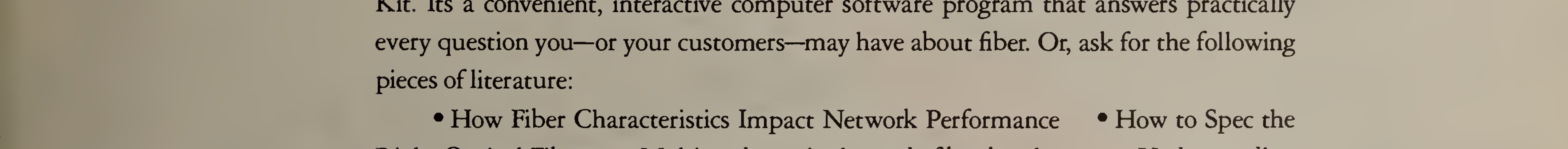

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Do you think the Federal Communications Commission made a fair decision when it recently proposed that frequencies used in microwave networks be reassigned to wireless communications service providers?

“No. We oppose it because the frequencies are already heavily used and most [microwave users] really need to remain in this area. If the FCC takes it away from us, we'll need to be reassigned to something very close.

“If the FCC gives us something in the 1-GHz to 3-GHz range and agrees to pay our moving costs, then it's not really a problem. Nevertheless, we don't feel that the frequencies are ideally suited for wireless communications. Most of the personal communications network vendors will primarily use the frequency for cordless telephones.”

Carl Bailey
President
Houston Association of
Microwave Users Group
Houston

“There seems to be a certain sense of fairness in the concept of having the new [wireless] entrepreneurs buy out the existing microwave users as a means to move the migration along more rapidly.

“But I'm sure it will be a traumatic experience for many of the microwave users who probably have ancient systems that they'd rather not have to do anything with.”

Ron Kopitowsky
Telecommunications director
Metropolitan Transportation
Authority of New York State
New York

“I'm indecisive. There's only a finite amount of bandwidth to allocate, and it seems that anything that can be done to make [wireless] technology more easily available for developers and users should be done. But to do this, something else has to give, and [here] it means displacing microwave users.

“Trying to reallocate the frequencies on an equitable basis is nearly impossible, and I'm not convinced an equitable solution exists.”

Nick Blazensky
Manager of site design
The Travelers Corp.
Hartford, Conn.

Diversification can protect managers from downsizing

Net execs must keep up with new technologies.

By Maureen Molloy
Staff Writer

Companies have been eliminating middle management layers in order to cut costs during the recession and become more competitive. That strategy has not been good news for network managers, however, with some becoming victims of corporate downsizing programs.

Net managers most likely to survive layoffs and prosper in the future are those who have kept abreast of the newest technologies — primarily in the data communications arena, such as local-area networking, internetworking and wide-area network design, according to Frank Schoff, president of Management Recruiters of Hendersonville, Inc. in Hendersonville, N.C., which specializes in the placement of network professionals.

Schoff, who closely monitors the current network job market, said net managers who survive in the 1990s will be proficient in multiple disciplines and not narrowly focused on a single technology.

David McKinney, a telecommunications supervisor at Bendix/King in Olathe, Kan., agreed that technical proficiency is key to surviving layoffs. He said the efforts he made to gain expertise in a range of technology areas — especially in LANs — helped him retain his job when Bendix/King recently eliminated an entire layer of middle managers.

“Those who got laid off were generalists who relied on their staff for technical assistance,” McKinney said. “I understand the technical aspects of what I manage, and this has obviously worked in my favor.”

But he added that keeping current with the technology while trying to fulfill management responsibilities is not easy.

“It can be a tough balancing act,” McKinney said. “The bottom line is that companies now want more for less, so you need to find a way to stay on top of the technology [and] not lose sight of how the technology can help the business.”

To increase their chances of surviving a corporate downsizing initiative, Schoff advises net managers to first broaden their skills via training courses, seminars and current industry literature. They should also try to have their job titles changed to reflect a broader suite of talents.

He said senior executives tend to perceive people with the title of telecommunications manager or network manager to have limited or narrowly focused technical skills. He suggested the title of information services manager as a suitable alternative.

“In the future, the job of a senior network manager will be performed by someone with multiple management assignments, such as computer operations, application development and end-user computing,” he said. “What is needed is a title that shows you're adept at a range of information technology services and not limited to a single area.” ◼

EXECUTIVE BRIEFS

BY MAUREEN MOLLOY

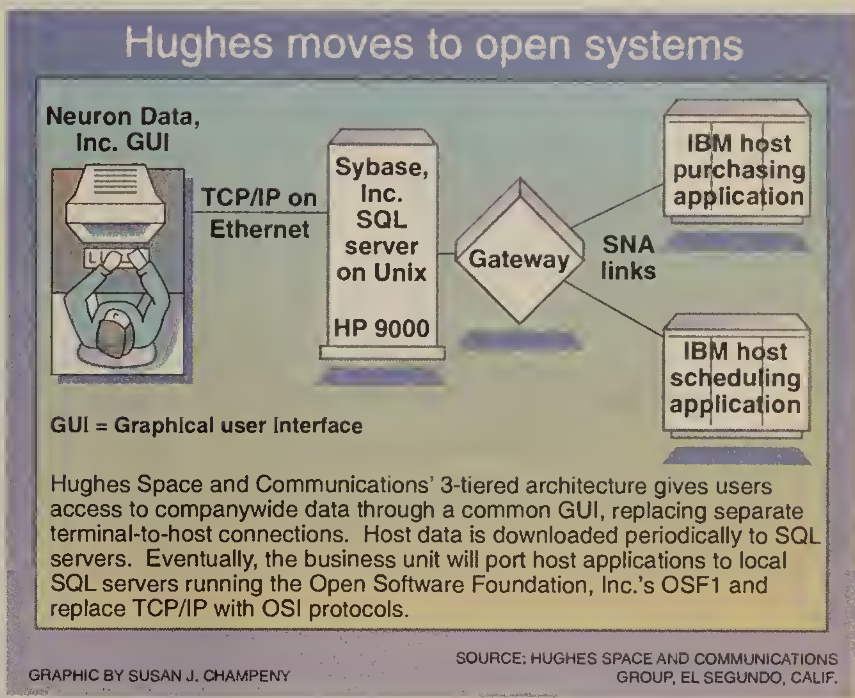
Computer groups bring comradery. Electronic computer groups make large, impersonal organizations feel small, even intimate, according to a University of Michigan psychologist. Thomas Finholt, an assistant professor of psychology at the Ann Arbor school, studied the electronic mail of a Fortune 500 company with more than 100,000 employees and found that personnel — particularly lower level staff — enjoyed the gossip and sense of being “in the know” that accompanied membership in an electronic computer group.

Fifty-six percent of these groups were developed for work-related purposes, while the remainder were discretionary groups comprised of managers and employees who discussed topics ranging from enology (wine fanciers) and child care (for locating babysitters) to cinema (for movie buffs).

Although about 60% of all E-mail came from work-related groups, it was the messages from the discretionary groups that

(continued on page 36)

Hughes moves to open systems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GUI = Graphical user Interface

Hughes Space and Communications' 3-tiered architecture gives users access to companywide data through a common GUI, replacing separate terminal-to-host connections. Host data is downloaded periodically to SQL servers. Eventually, the business unit will port host applications to local SQL servers running the Open Software Foundation, Inc.'s OSF1 and replace TCP/IP with OSI protocols.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: HUGHES SPACE AND COMMUNICATIONS GROUP, EL SEGUNDO, CALIF.

Hughes unit tackles issue of going open

Company developed a three-tiered approach for smooth sailing to open systems platform.

By Wayne Eckerson
Senior Editor

EL SEGUNDO, Calif. — While many companies heartily endorse the notion of open systems, few have made plans to implement the technology and fewer still have begun building them.

One company that is acting on the promise of open systems is Hughes Space and Communications Group, a business unit of Hughes Aircraft Co. The satellite and network equipment maker, based here, is in the midst of an aggressive systems integration effort that is laying the foundation for standards-based computing and communications within the firm.

With the assistance of Cambridge Technology (CT) Partners, a systems integration firm based in Cambridge, Mass., Hughes Space and Communications has developed a three-tiered architecture that provides a smooth transition from its proprietary host-based applications to a client/server platform. This new platform is based on Open Systems Interconnection network protocols, as well as the Open Software Foundation, Inc.'s (OSF) version of Unix, called OSF1, and the Motif graphical user interface (GUI).

The new architecture will enable Hughes Space and Communications to speed up product development cycles and reduce processing and communications costs, according to Chris Pidgeon, chief technologist at the company. He declined to specify how much the unit is investing in the project or how much money the firm expects to save.

To reap the potential benefits as quickly as possible, Hughes Space and Communications and CT Partners have set an aggressive development schedule. The firms plan to roll out applications based on the new architecture in June — only 10 months after the first prototype was presented to senior executives for approval (see graphic, page 36).

Accelerated integration

Originally, Hughes Space and Communications projected that it would take between three and five years to implement a true open systems architecture and another year or two before the company could begin to accrue cost savings and other benefits.

But consultants from CT Partners showed Hughes Space and Communications how it could accelerate the integration of its multiple proprietary systems by installing Unix servers as an intermediate processing layer between hosts and end-user terminals (see graphic, this page). Although the three-tiered architecture would be an interim step to open systems, it would provide more immediate payback, Pidgeon said.

“CT Partners demonstrated to our executives that they could deliver the benefits and functionality we wanted in a much shorter time frame,” he added.

Three-tiered architecture

Currently, end users at Hughes Space and Communications use IBM 3270 terminals to run core applications on two IBM-compatible mainframes.

(continued on page 36)

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PRINTERS. PAGES AHEAD

Hughes unit tackles issue of going open

continued from page 33

The terminals communicate with the hosts across an IBM Systems Network Architecture network. Each application uses a different set of commands and data formats that users must learn.

In the new architecture, end users will use personal computers and Apple Computer, Inc. Macintoshes to access host data and applications. The PCs and Macintoshes, which will comprise the first tier of the architecture, will both support a Motif-like GUI, called Open Interface, from Neuron Data, Inc. Hughes Space and Communications also plans to port the Open Interface GUI to X terminals and workstations at a later date.

The PCs and Macintoshes will be linked across an Ethernet network to four Sybase, Inc. servers, which will make up the second tier of the architecture. The servers, which will run on Hewlett-Packard Co. 9000 Unix processors, will store host data for 11 predefined core applications, including purchasing, scheduling and materials resource planning, Pidgeon said.

Users will access host data on the Sybase servers using SQL routines and Sybase remote procedure calls, said Miguel Picornell, one of seven CT Partners developers working on the project.

Data from the hosts will be downloaded to the servers monthly, weekly or daily, depending on the application, said Meg Smyth, associate director at CT Partners and manager of the Hughes Space and Communications' account. For example, financial applications will be updated weekly, while inventory and engineering applications will be updated daily.

The third tier of the architecture will consist of two IBM mainframes, which will be linked to the Sybase servers through an SNA/Ethernet gateway provided by OpenConnect Systems in Carrollton, Texas. The Ethernet network, which currently links Hughes Space and Communications' manufacturing and engineering sites and runs the Transmission Control Protocol/Internet Protocol, will eventually run OSI as soon as OSI products become more widely available, Pidgeon said.

The three-tiered architecture allows Hughes Space and Communications to leave its host systems and applications intact, avoiding the expense and delay of recoding host applications to support a common user interface and run over a non-SNA network, he added.

Chronology of Hughes' open systems project

1990-mid-1991	**Strategic phase:** Hughes Space and Communications sets long-term business strategy and assesses information systems' ability to support the strategy.
June 1991	**Prototype phase:** Cambridge Technology Partners helps Hughes Space and Communications develop a prototype of an integrated network computing platform.
Sept. - Oct. 1991	**Design phase:** Users' needs and technical requirements are formally defined.
Nov. 1991 - May 1992	**Development phase:** A working platform is developed and tested.
June 1992	**Implementation phase:** Product is rolled out to 250 targeted users.

SOURCE: HUGHES SPACE AND COMMUNICATIONS GROUP, EL SEGUNDO, CALIF.
GRAPHIC BY SUSAN J. CHAMPENEY

Hughes Space and Communications plans to move host applications to the Unix or OSF1 servers whenever it needs to purchase new application software or significantly enhance existing applications, according to Pidgeon.

"The new architecture will enable our firm to be more responsive to a dynamic business environment, as well as to our users, suppliers and customers," he said. ◘

Executive Briefs

continued from page 33

people responded to most often, Finholt said. Messages sent to discretionary groups received replies 61% of the time vs. just 21% of the mandatory groups.

Finholt said computer groups have often been criticized for being impersonal and comprised of anonymous or barely known members incapable of relating to each other as humans because of the technology barrier.

But according to Finholt, the study found that E-mail flattens the barriers of time, distance, organizational boundaries and, in some cases, hierarchy. The absence of a specific time and setting for the group "meeting," combined with the virtual invisibility of the individual members, seems to put people at ease.

UniForum intros guide. UniForum, the international association of open systems professionals, has released "Electronic Mail De-Mystified," a guide to help network managers and staff working in open systems environments understand how electronic mail works by providing an overview of the major Unix E-mail components.

In addition to a brief history about Unix E-mail, the 34-page guide addresses a host of topics and contains a glossary of 56 Unix E-mail terms.

The guide costs $5 for UniForum members and $10 for nonmembers. To obtain a copy, contact UniForum at (800) 255-5620. ◘

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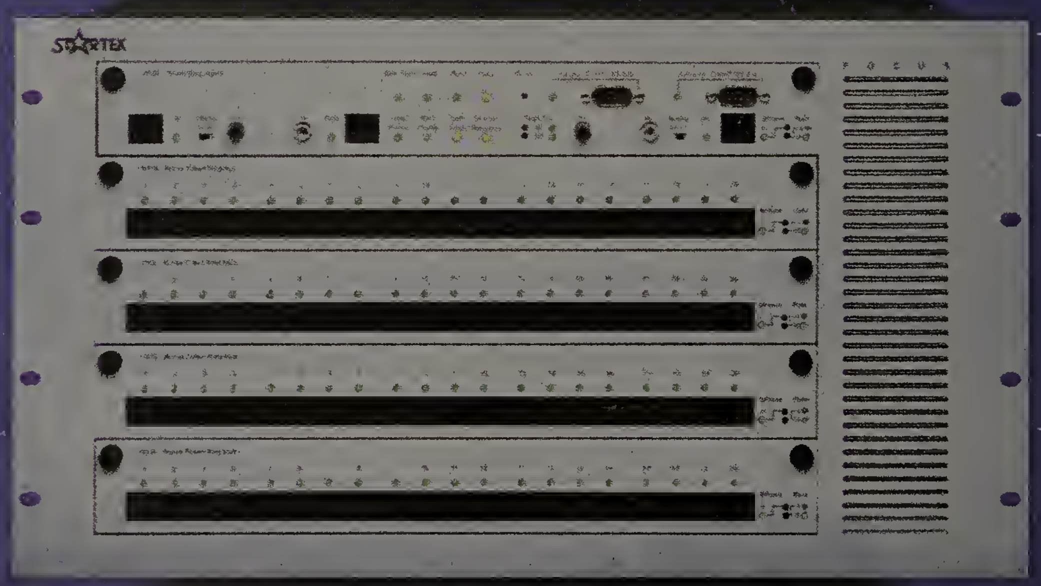

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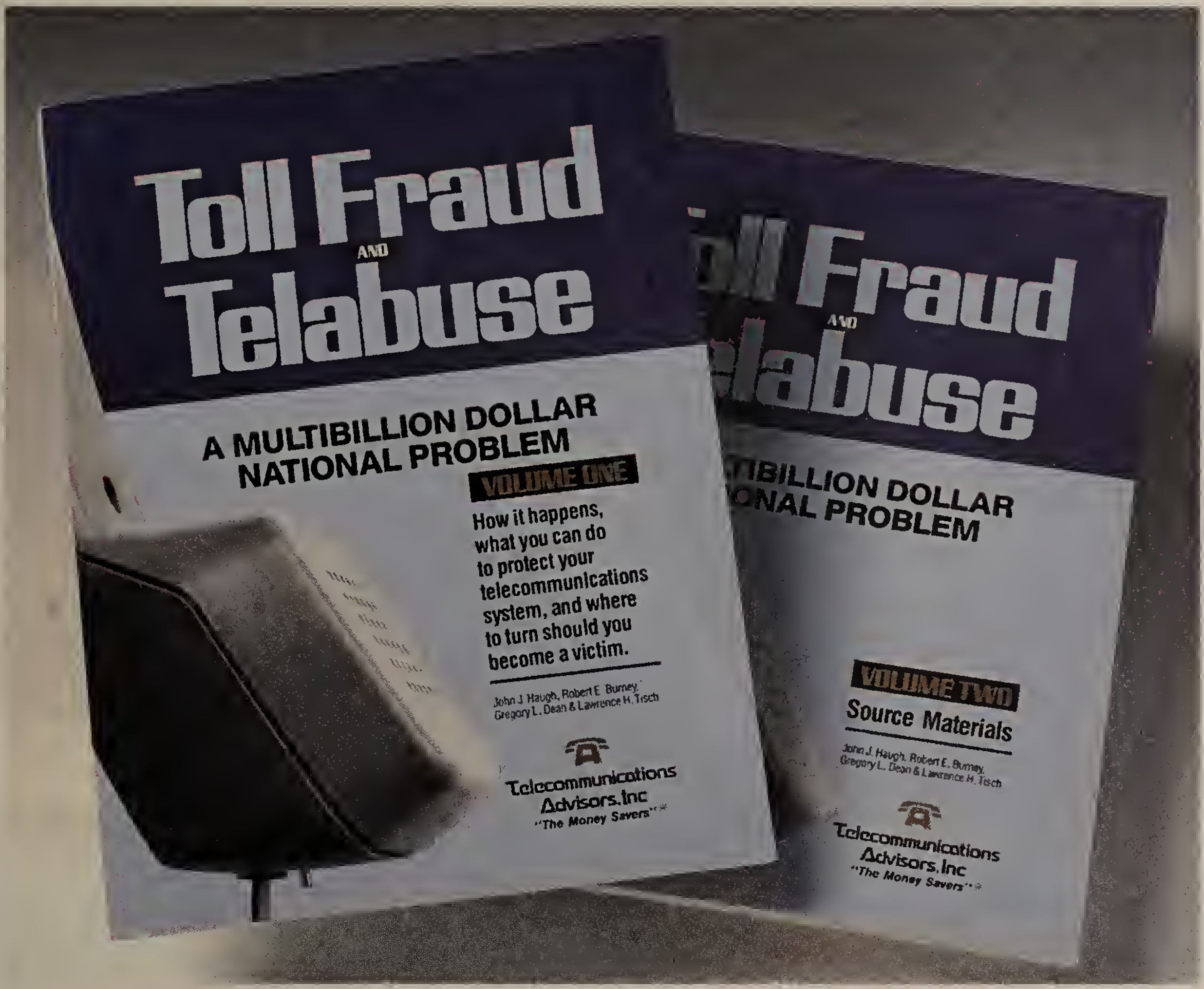
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WRITTEN BY LAWYERS AND TELECOMMUNICATIONS VETERANS

John J. Haugh is a lawyer. A graduate of Notre Dame Law School, he is a former president of the Oregon State Bar and the Western States Bar. A member of the Federal Communications Bar Association (FCBA), the Communications Fraud Control Association (CFCA), and an associate member of the Society of Telecommunications Consultants (STC), Mr. Haugh manages his law firm and serves as chairman of Telecommunication Advisors, Inc., a telecommunications consulting firm.

Robert E. Burney, a graduate of Reed College and Lewis & Clark Law School, is a lawyer in private practice and Vice President and Director of Research for Telecommunications Advisors, Inc. He has extensive experience in computer applications as well as software programming. Mr. Burney's area of specialized expertise involves the various methods used to penetrate systems and steal long distance as well as countermeasures.

Gregory L. Dean is an independent telecommunications consultant who retired as an Air Force Lieutenant Colonel in 1991 after a 23 year military career. The holder of a Masters Degree from the University of Oklahoma, Mr. Dean served as a Communications-Computer Specialist in the Air Force. He is an acknowledged expert in systems integration and security and has extensive experience in preventing system penetration, espionage and misuse.

Lawrence H. Tisch is the Director of Carrier Relations for Payline Systems, Inc., a publicly traded Operator Service Provider (OSP) located in the Pacific Northwest. Mr. Tisch has been active in the telecommunications field in various capacities since 1968. He was involved in the installation of the first AUTOVON in Europe and, as one of MCI's first technical employees, the installation of MCI's initial carrier equipment.

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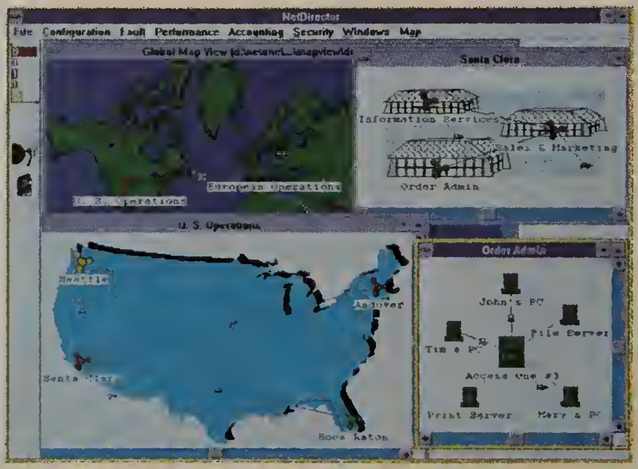

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World News

The Boston-based **Gillette Company, Inc.** this week will announce a contract to obtain international X.25 transport services from BT North America, Inc.

BT North America will acquire local-loop circuits linking Gillette offices in 180 countries to the carrier's global value-added network. BT North America will also provide Gillette with customer premises equipment network maintenance services.

Gillette will use BT North America's X.25 services to shuttle batch and interactive data between IBM mainframes and minicomputers as well as Digital Equipment Corp. minicomputers around the world. Currently, Gillette uses public data network (PDN) services from local monopoly carriers to handle that data.

In a written statement, Rick Manser, telecommunications manager at Gillette, said the monopoly carriers' PDN services provide poor throughput and network performance.

Using local carrier PDN services also forces Gillette to contract with multiple service providers.

BT North America will furnish Gillette with a single service provider for global network services.

In recent speech in Madrid, Spain, Sir Leon Brittan, the **Commission of the European Community's (CEC)** vice-president in charge of competition policy, said the commission this year will evaluate whether to allow carriers in the Common Market to maintain monopolies over the provision of pub-

(continued on page 40)

Proposed laws may relax Canadian net regulations

New rules would ease connection to public nets.

By Richard Adhikari
Special to Network World

OTTAWA — In a move that could spell relief for large network users, the Canadian government will soon propose new, national telecommunications laws that would replace a hodgepodge of restrictive regulations in many Canadian provinces.

If passed, the proposed Telecommunications Act would for the first time let Canada's federal government force provinces to eliminate rules that limit users' ability to link their own equipment to the public network. This, in turn, would make it easier for users to build networks spanning that country.

The new act could also reduce the confusion generated by Canadian network regulations that differ widely from province to province.

"One of the difficulties with the current setup is that an executive [cannot easily plan a network across Canada] because provincial regulations differ," said Monty Richardson, executive director of the Communications Competition Coalition, an industry trade group that lobbies for telecommunications reform in Canada. "There are also delays [from] dealing with multiple regulators, and the process is very costly."

Hodgepodge of rules

Currently, Canadian telecommunications is governed by a jumble of national and regional rules. A national regulatory framework was established by the Railways Act of 1902. This act gives the Canadian Radio-television and Telecommunication Commission (CRTC), Canada's

(continued on page 40)

Adhikari is a free-lance writer based in Toronto.

German telecom minister backs privatization plan

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — In a recent speech here, Germany's highest ranking telecommunications official said Deutsche Bundesposte (DBP) Telekom, the country's state-owned monopoly carrier, could be privatized in the near future.

According to Christian Schwarz-Schilling, minister of posts and telecommunications, DBP Telekom needs to be transformed from a government bureaucracy into a private company to compete in the rapidly changing global network market. Only a private company can foster the entrepreneurial, corporate culture needed to effectively meet user needs, he said.

"The carrier in Germany cannot effectively compete as a public administration in the long run," Schwarz-Schilling said.

Previous reform favored

Schwarz-Schilling said he wanted to privatize DBP Telekom in the late 1980s, when Germany radically revamped its network regulations. But the German parliament opposed the move.

"It was totally, politically impossible even to raise discussion [about privatizing DBP Telekom at that time]," he said.

But now, political attitudes have changed enough that there is a good chance the government will proceed with privatization, Schwarz-Schilling said. He explained that many unions oppose privatization and have kept the Social Democrats, Germany's main opposition party, from backing the proposal.

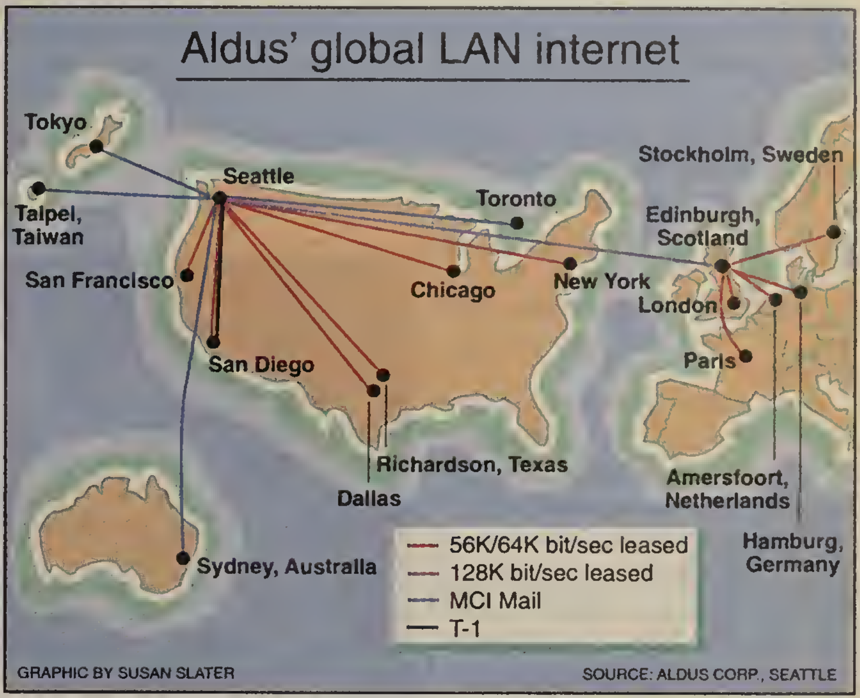
But Schwarz-Schilling said the case for privatizing DBP Telekom is now so compelling that some Social Democrats would be willing to oppose the unions on this issue.

He said there are even odds that enough Social Democrats will join the ruling Christian Democrats in support of privatization.

Germany's constitution stipulates that DBP Telekom must be owned by the government. A two-thirds majority in parliament is needed to change this provision.

The German parliament will probably discuss privatization of the carrier this spring, Schwarz-Schilling said.

He said privatization would not only make DBP Telekom more competitive, but it would also help the carrier raise the $33 billion needed to upgrade eastern Germany's public network. ◪



GRAPHIC BY SUSAN SLATER

SOURCE: ALDUS CORP., SEATTLE

Aldus deploys global client/server net

Net links 2,500 peer nodes in private LAN internet; routers support AppleTalk and TCP/IP protocols.

By Barton Crockett
Senior Editor

SEATTLE — Many users dream of deploying global LAN internetworks that support client/server computing worldwide.

Aldus Corp., based here, is making that dream a reality. During the past three years, the software maker has built a router-based, private local-area network internet that links more than 2,500 personal computers, workstations and minicomputers on two continents.

Previously, Aldus had no LAN internet or wide-area network of any kind. Company officials said the new global LAN internet lets employees around the world share applications and data much more efficiently.

The internet also lets Aldus run an array of client/server applications.

"Our WAN is nothing more than a LAN extended globally," said Bill Bysinger, director of Aldus Information Systems, the company's IS unit. "It's all peer to peer."

According to Bysinger, Aldus has PCs and workstations in 13 offices in the U.S. and Europe that reside on Ethernet LANs supporting Apple Computer, Inc.'s AppleTalk, the Transmission Control Protocol/Internet Protocol and other standards.

The LANs are internetworked using bridges and routers from Advanced Computer Communications and Wellfleet Communications, Inc. Interoffice traffic flows over an international private-line network based on digital private lines ranging in speed from 56K bit/sec to T-1.

The seven U.S. offices are linked in a star topology to the company's headquarters here. A 128K bit/sec transatlantic private line links the company's U.S. headquarters to a European hub in Edinburgh, Scotland (see graphic, this page).

Don Moore, Aldus' network manager, said the company built the LAN internet during the past three years. He added that Aldus went through a typical migration pattern, where the capacity of WAN links were upgraded as traffic levels increased.

Initially, Aldus began linking geographically dispersed LANs using public dial-up telephone circuits. Then the company routed LAN internet traffic over private dedicated analog lines.

Aldus began installing the digital private-line WAN about a year and a half ago, Moore said. The company expects to finish installing the net in March.

Most of the traffic on the global LAN internet is electronic mail. Moore said Aldus uses E-mail to carry sales records, technical support files and master copies of software products between offices.

Bysinger added that the global LAN internet also supports a wide range of strategic client/server applications.

Aldus runs client/server applications in such areas as administration, human resources, order processing and product engineering. Bysinger said the client/server architecture enables PC clients to access applications and data residing on servers

(continued on page 41)

Proposed laws may relax regs

continued from page 39

national regulator, limited authority to regulate network services between Canadian provinces.

The Railways Act gives local regulatory boards control over network services within provinces. In some instances, local regulatory boards use this power to enact restrictive regulations, both for intra- and interprovincial services.

Most of the restrictive laws are in the western provinces of Alberta, Manitoba and Saskatchewan. Regulators in these more rural provinces often resent being ruled by the CRTC and sometimes view their local carrier as a cash cow that can help support their local government's finances.

> "We can't, as a country, afford the current system," Richardson said.
>
> ▲▲▲

Many of the restrictive rules limit users' ability to deploy their preferred customer premises equipment. Many provinces insist that users lease equipment from the local carrier.

At least one Canadian bank has been victimized by this policy, said Phil Hogg, director of operations at the Canadian Banker's Association. A few years ago, a major Canadian bank was not allowed to install a credit card authorization terminal in a Western province, he said.

Hogg declined to name the bank or the province but did say the bank was not allowed to install a point-of-sale terminal because the device had a telephone handset. Regulators considered the device a telephone that should be supplied by the local carrier.

The provinces also often ban the use of the public switched telephone network to access public data network and resale services from competitors to local carriers.

The proposed Telecommunications Act seeks to eliminate these problems. Sources at the Department of Communications who requested anonymity said the proposed act will bring most network regulations in the Western provinces under the CRTC's authority. This should benefit users since CRTC regulations are less restrictive than existing rules in those areas.

The Telecommunications Act would also enable the CRTC to let carriers introduce new services or change tariffs without filing applications and holding hearings.

Currently, every carrier under the CRTC's jurisdiction must file an application for every new service or tariff change. It takes at least several months for hearings to be held on these applications.

"We can't, as a country, afford the current system," Communications Competition Coalition's Richardson said. "It delays innovation."

The CRTC could choose to forgo the hearings process if adequate competition exists in the market. George Horhota, president of the Canadian Business Telecommunications Alliance, a leading Canadian user group, said users would favor this reform. ◘

World News

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lic switched telephone services.

Currently, public switched telephone service monopolies exist in every Common Market country except the U.K.

However, Brittan said the CEC recently completed a study showing that users in the U.S. have benefitted from competition in the public switched market with lower prices, greater usage, improved service quality and innovation.

For example, he claimed that callers in Europe pay three to four times more for calls between European cities than users in the U.S. pay for domestic calls of a similar distance.

On Feb. 1, **PTT Telecom Netherlands** instituted price cuts ranging from 3% to 15% for international digital private-line services at speeds ranging from 64K to 512K bit/sec. The carrier also recently said that the Royal Nedlloyd Group in Rotterdam, the Netherlands, has agreed to use the carrier's international virtual network service on a pilot basis to carry telephone traffic between company offices in Atlanta, Hong Kong, Rotterdam and Singapore.

PTT Telecom Netherlands' international virtual network service is provided in conjunction with Cable & Wireless PLC, which owns Hong Kong's monopoly carrier, and US Sprint Communications Co.

BellSouth Corp. last week said that Optus Communications, a consortium it jointly owns with **Cable & Wireless PLC** that is aiming to become Australia's second carrier, has completed its purchase of Aussat, Pty., an Australian satellite service provider.

Optus will use Aussat to anchor a carrier that is expected to begin competing with the country's former monopoly, Australian and Overseas Telecommunications Corp. this year.

BellSouth and Cable & Wireless each own 24.5% of Optus, while four Australian companies own the rest.

United Parcel Service of America, Inc. last week said it has completed installation of UPSNet, a private packet switched network that shuttles data between 1,200 UPS facilities in 80 countries.

UPSNet is based on packet switches from Northern Telecom, Inc. that route data traffic over a backbone network based on T-1 multiplexers. The net links more than 2,000 local-area networks and four large host computers. ◪

Aldus deploys int'l net

continued from page 39

throughout the company.

These servers run a variety of LAN operating systems, including Novell, Inc.'s NetWare and Microsoft Corp.'s LAN Manager. Data resides primarily in distributed Oracle Corp. and Sybase, Inc. database management systems.

> The client/server architecture enables Aldus to reduce network traffic.
>
> ▲▲▲

Bysinger said Aldus builds its client/server applications in-house using an internally designed client/server methodology, called Phoenix.

Aldus also designed an object-oriented programming toolset, called Blacksmith, which it uses to speed application development.

Previously, Aldus ran most applications on Prime Computer, Inc. and Sequent Computer Systems, Inc. minicomputers. But Bysinger said applications can be developed for PCs and workstations using Aldus' client/server architecture in less than a third of the time it took to develop applications for the minicomputers.

He explained that client/server applications can be developed faster because the client/server programming languages are simpler and easier to use.

Cutting application development time makes Aldus more competitive and saves money. For example, Bysinger said a new application for the minicomputers would have taken an average of 18 months and $200,000 to develop. Now the firm can develop the same application in a client/server environment in 90 days at a cost of $70,000.

The client/server architecture also enables Aldus to reduce network traffic and improve application response time. This is because Aldus can distribute much of the application processing and data storage to local clients, reducing the number of times clients must traverse the network to access remote servers. ◪

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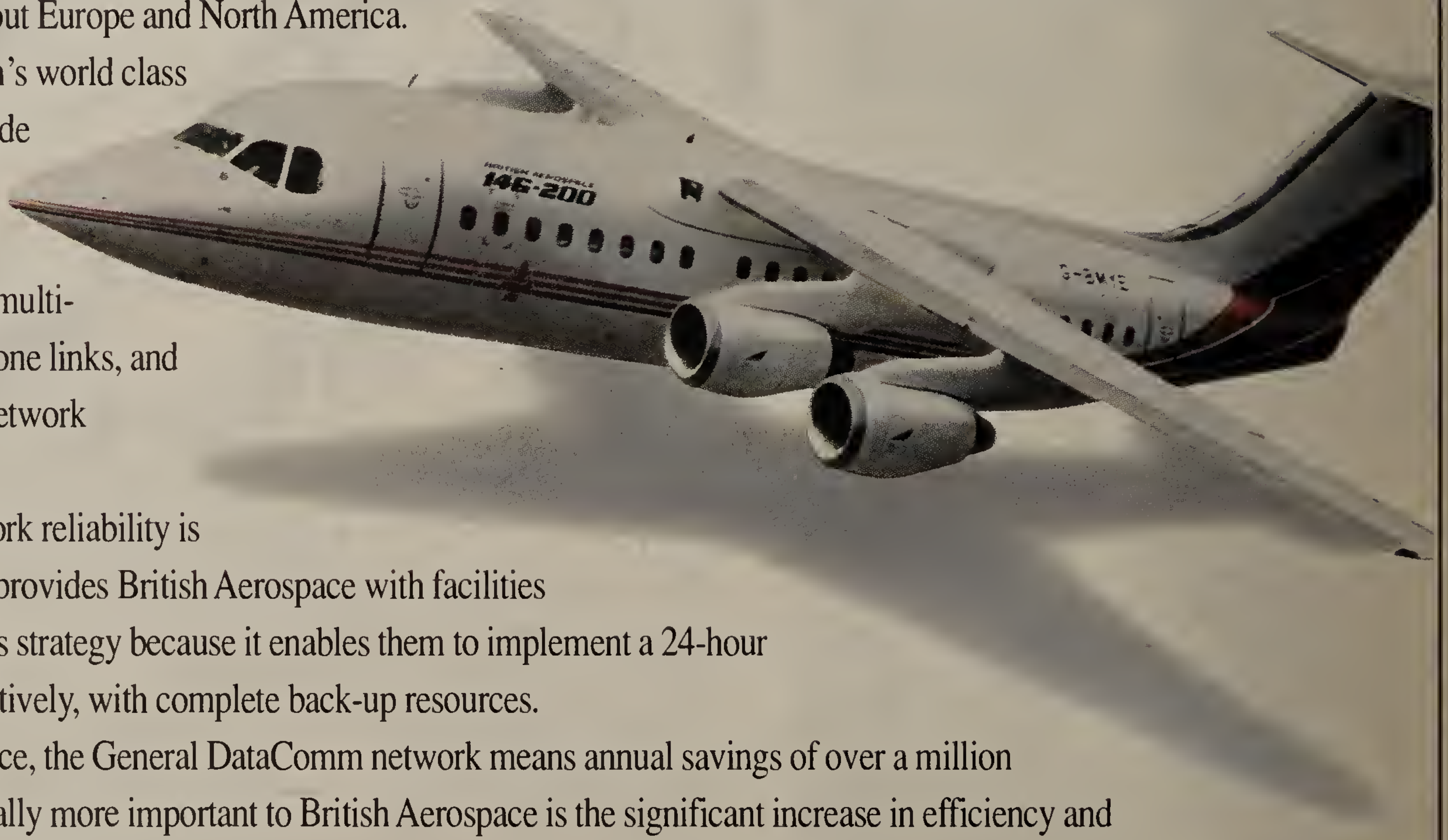

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Circle Reader Service #106

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Maxpeed introduces low-cost terminal server

Maxpeed Corp. recently unveiled an Ethernet terminal server that costs just $100 per port.

The **SC-16 Intelligent Terminal Server** is a stand-alone unit with 16 RJ-45 serial ports and one parallel port that is used to link up such devices as terminals, modems and printers to an Ethernet network. Each port can support speeds of 115K bit/sec.

The device has a 16-MHz Intel Corp. 80286 microprocessor, which handles the Transmission Control Protocol/Internet Protocol network connection. It also features a 512K-byte memory buffer that balances the transfer rate between the Ethernet connection and the serial devices.

The SC-16 supports an AUI or BNC connection for either thick or thin Ethernet and an RJ-45 connection for linking with unshielded twisted-pair Ethernet. The TCP/IP and network connections are built into the unit, so no configuration or driver installation is required, the company said.

Available now, the SC-16 is priced at $1,695.

For more information, contact Maxpeed at (415) 345-5447.

Scheduler software to operate with pagers

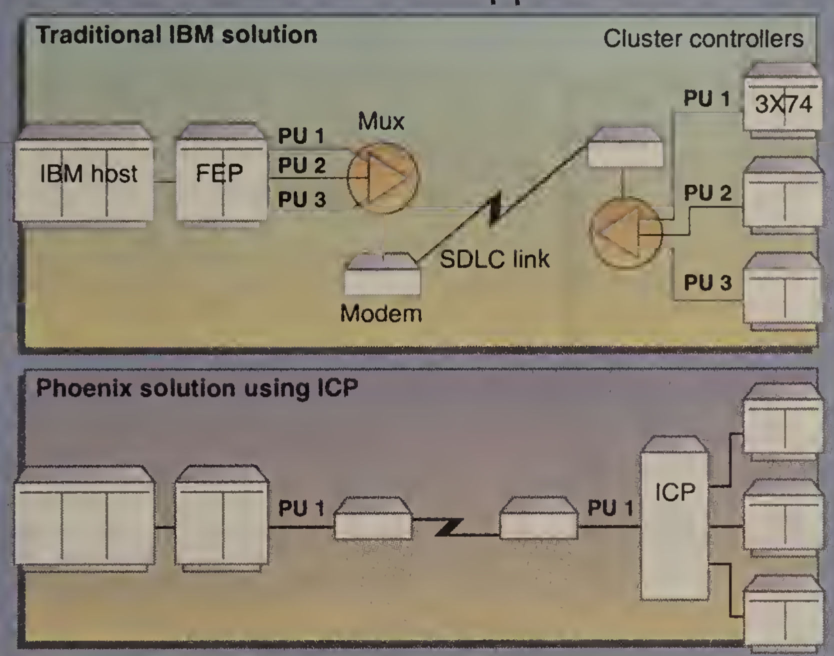
Campbell Services, Inc. is expected to unveil in April a new version of its **OnTime** group scheduling software that enables users to receive scheduling notification via pagers.

The new version will also support calendar reconciling features as well as meeting distribution lists. The company said it has future plans to offer a palmtop and Pen Windows version of OnTime as well as support for Microsoft Corp. Windows' Object-oriented Linking and Embedding.

The new version is expected to cost the same as the current version, which is priced at $356 for three users, $4,680 for 100 users and $42 for each additional user.

For more information, contact Campbell Services at (313) 559-5955.

Phoenix ICP now supports SDLC



FEP = Front-end processor
ICP = Intellinet Communications Platform

ICP enables users to consolidate remote terminal traffic over a single wide-area link to an IBM host, conserving FEP ports.

SOURCE: PHOENIX DATA COMMUNICATION CORP., EAST GREENWICH, R.I.
GRAPHIC BY SUSAN J. CHAMPENY

Phoenix Data adds support for SDLC to WAN server

ICP melds remote terminal traffic onto X.25 nets.

By Joanne Cummings
Staff Writer

EAST GREENWICH, R.I. — Phoenix Data Communication Corp. recently added support for IBM's Synchronous Data Link Control protocol to its Intellinet Communications Platform (ICP), enabling the device to consolidate remote terminal traffic for transmission to an IBM host over X.25 lines.

The ICP reduces the number of front-end processor ports needed to support a remote terminal network because it can handle as many as 254 logical unit sessions with an IBM host while appearing as a single physical unit to the front-end processor, according to Thomas McGovern, president of Phoenix Data.

By comparison, a multiplexer linked to several remote cluster controllers can only support a maximum of 32 logical unit sessions per front-end processor port, he said (see graphic, this page).

The ICP unit sits at a remote site, consolidating traffic from one or more remote cluster controllers over X.25 lines. Previously, the unit supported only X.25, Unisys Corp.'s Poll/Select, NCR Corp.'s Poll/Select and teletypewriter terminal protocols.

With the addition of Systems Network Architecture/SDLC support, the ICP is expected to help the company gain a foothold in the IBM market as an alternative to multiplexing terminal traffic over wide-area links, according to McGovern.

Phoenix Data is offering the ICP in three models. The Model 6200 has a single Intel Corp. 80186 microprocessor card and can be configured with three to six ports supporting local cluster controllers.

The Model 6400 comes with either one, two or three processor cards and can be configured with six, 12 or 18 ports. Each processor card can support an unlimited number of physical units and as many as 508 logical unit sessions. Due to throughput considerations, however, McGovern recommended an average of 254 logical units per card. Both models are available now.

> ICP can handle as many as 254 logical unit sessions with an IBM host.
>
> ▲▲▲

The Model 6800, available in April, comes with as many as eight processor cards and can support as many as 48 ports and 4,064 logical unit sessions. The processor cards are linked via a 16M bit/sec internal bus, McGovern said.

The ICP currently supports X.25 net connections ranging in speed from 300 to 64K bit/sec,

(continued on page 45)

DEC's LAN offerings shore up low end

Firm also unveils components for OSF platform so vendors can start to develop applications.

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. recently unleashed a bevy of local-area networking products in an effort to shore up its low-end networking offerings.

DEC introduced a board that turns IBM Personal Computer ATs into DEC's DECnet routers, unveiled hardware and software options for its Fiber Distributed Data Interface concentrators and bridges, and introduced new models of its MicroVAX 3100 LAN servers.

DEC also disclosed pricing and availability of Proteon, Inc.'s TokenView management systems for token-ring networks, which DEC resells.

Separately, DEC unveiled components of the Open Software Foundation, Inc.'s Distributed Computing Environment so software vendors can begin to develop distributed applications.

The Etherworks Router/DECnet Version 1.0 connects users on an Ethernet LAN in remote branch offices to DECnet networks. It provides DECnet Phase IV routing for as many as 1,024 nodes on the LAN via the Digital Data Communications Message Protocol over asynchronous and synchronous lines at 64K bit/sec. The Etherworks Router forwards 250 64-byte packet/sec.

Routing software for the card is downloaded to the PC AT from an MS-DOS PC on the LAN running DEC's Pathworks for DOS software. Etherworks Router is priced at $1,495 and will be available this month.

DEC's DECconcentrator 500 for FDDI LANs and DECbridge 51x/52x/600 series Ethernet-to-FDDI bridges now support the

(continued on page 45)

Firm automates features of LAN-based virus tool

By Joanne Cummings
Staff Writer

BOSTON — XTree Co. this week at NetWorld 92 Boston is expected to unveil a new version of its LAN-based virus software that automatically informs a network administrator about a virus outbreak and provides easier installation and configuration for large sites.

Designed for use on IBM's Network Basic I/O System and Novell, Inc. NetWare local-area networks, ViruSafe/LAN Version 4.5 is software that resides on each LAN node.

The product consists of several modules that enable it to monitor, detect and remove viruses in memory, file-allocation tables, boot sectors, partition tables and root directories as well as all executable files.

The new version automatically collects and combines virus-checking reports from each workstation on the LAN and relays the information back to the server, where the network administrator can monitor virus activity, according to King Lee, XTree's chief executive officer.

Previous versions of the software would eliminate the viruses on the workstation without notifying the administrator.

Version 4.5 is easier to install and configure than the previous version, he said.

For example, the software provides a listing of all the users on the LAN and enables the network administrator to configure ViruSafe/LAN individually for each workstation from the administrator's console. When each user logs on, the software automatically copies the administrator's configuration information to the workstation and updates its AUTOEXEC.BAT file, if necessary.

In the past, the network administrator had to go to each workstation to perform configuration.

The new feature enables an administrator to individually configure and maintain virus protection for hundreds of users from a single site, Lee said.

Available now, ViruSafe/LAN is priced at $595, which includes a license for 10 users. XTree also offers corporate volume purchase agreements and site licenses.

For more information, contact XTree at (805) 541-0604.

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CODE X1805

Circle Reader Service #109

Retix adds new high-end E-net bridge/router

By Joanne Cummings
Staff Writer

SANTA MONICA, Calif. — Retix recently added a high-end offering to its line of multiprotocol Ethernet bridge/routers.

The new 4982 Remote Bridge/Router contains a Motorola, Inc. 68030 and 68020 processor and can transmit packets two times faster than the firm's mid-range remote bridge/router, the 4942.

The 4982 can bridge 8.6K packet/sec and route between 5K and 7K packet/sec, while the 4942, which is based on two 68020 processors, bridges about 8K packet/sec, only routing between 4K and 6K packet/sec.

The 4982, like the 4942, supports one thick- or thin-wire Ethernet connection and two wide-area links at speeds up to 2.048M bit/sec. The 4982 offers routing for the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet and Novell, Inc.'s Internetwork Packet Exchange (IPX). It can bridge all other standard network protocols.

The new bridge/router also supports X.25 packet switching and data compression at speeds up to 56K bit/sec and contains a Simple Network Management Protocol agent so it can be controlled by any SNMP-compliant management system.

Available now, the 4982 is priced at $7,950, which is $1,000 more than the 4942 model.

For more information, contact Retix at (310) 828-3400.

DEC's LAN offerings shore up low end

continued from page 43

Simple Network Management Protocol SET and TRAP commands, allowing network managers to configure, control and change parameters on the devices from an SNMP management console. Previously, the devices could only be monitored by SNMP consoles.

The DECconcentrator 500 now supports out-of-band management, which allows administrators to continue to manage devices if the primary communications link is disabled. An RS-232 connection is established between the concentrator and an ASCII terminal for local management. For remote management, the terminal is linked to the concentrator through a modem. In addition, the dual-ring-attached concentrator now supports connection to external optical bypass relay devices from third parties.

The DECconcentrator with out-of-band management, SNMP and optical bypass software costs $3,000. The optical bypass module costs an additional $3,000. Software updates for existing customers are priced at $175. All products will be available this month.

The DECbridge 500 and 600 series Version 1.2 software update is priced at $175 and will be available in April.

Meanwhile, Proteon's TokenView SNMP Agent management system allows users to monitor its ProNET-4/16 token-ring LANs as well as other IEEE 802.5-compliant LANs via SNMP. Available now, TokenView from DEC is priced at $1,295.

Another release, DEC's Distributed Computing Environment Starter Kit, is intended to initiate development of distributed applications for multivendor networks. It includes remote procedure call tools and directory services.

The kit runs under Ultrix Version 4.2 and DEC OSF/1 Version 1.0, which also debuted recently. It is available in three individually priced packages, ranging from $200 to $2,000, and will ship in May.

DEC OSF/1 Version 1.0 is priced at $199 for a two-user license and will be available in March. Additional user licenses start at $530. Ultrix customers can convert to DEC OSF/1 for $199.

Firm adds support for SDLC to server

continued from page 43

with a maximum of four ports at 64K bit/sec and two ports at 19.2K bit/sec for each six-port module.

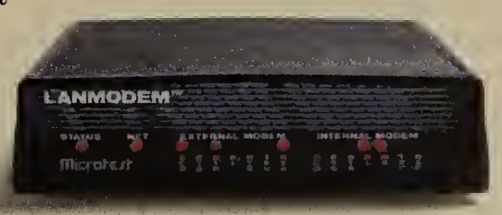
The SNA/SDLC support can be implemented as the sole protocol on the ICP or mixed with other traffic such as X.25. The ICP can support the multiple protocols simultaneously over an X.25 wide-area line. McGovern said it "spoofs" the protocols, which means the ICP polls local cluster controllers, instead of the front-end processor polling them over the wide-area network. Likewise, the front-end processor at a host site polls only the remote ICP, rather than every cluster controller.

The addition of SNA/SDLC support also incorporates a Transparent Remote Polling capability. This enables the ICP to link multiple non-PU Type 2 SDLC devices — such as automated teller machines — and PU Type 2 devices over a single X.25 backbone.

In addition, McGovern said that users can simultaneously support LAN-to-host traffic, as well as SNA/SDLC traffic, via the ICP.

Support for SNA/SDLC is included in the price of the ICP, which ranges from $3,900 for a three-port Model 6200 to $53,000 for a 48-port Model 6800.

For more information, contact Phoenix Data at (401) 884-5670.



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OPINIONS

BROADBAND NETWORKING

BY PETER DAVIDSON

Gov't must get involved in setting up telecom roads

The double-dip recession we're now in isn't quite as bad as the Great Depression. But the recent pall of economic gloom and uncertainty has sparked talk of parallel legislative solutions.

Of course, the quintessential New Deal recovery plan of the 1930s was government subsidies to build roads. This course of action not only created jobs, but also created a physical infrastructure over which economic growth was driven for decades to come. Now we're hearing calls for the government to build more roads, just as it did 60 years ago. But times have changed, and the current need isn't for physical roads, but for electronic highways.

A recent report from the Iacocca Institute at Lehigh University underscores this idea. The report found a need for a nationwide wideband network to keep U.S. manufacturing competitive by supporting agile rather than mass manufacturing, concurrent engineering and countless other applications.

In fact, *Network World* recently quoted Iacocca Institute Director Kenneth Preiss as saying "The network will be the driver for the next industrial revolution."

> "The network will be the driver for the next industrial revolution."
>
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Indeed, the communications industry as a whole — and all U.S. businesses that rely heavily on it — could benefit handsomely from the rapid implementation of leading-edge network infrastructures. But we are in a chicken-and-egg situation where the free-market development of these infrastructures is bound to be sluggish at best.

For instance, the leading driver envisioned for wideband network technologies, such as Synchronous Optical Networks (SONET), is imaging. But one of the key obstacles to the implementation of imaging networks is the lack of wideband networks. Which comes first? In a natural evolution, the answer is a little of both and it all happens very slowly.

Unfortunately, our industry is stuck in a narrowband network infrastructure on a number of fronts. Where is the all-fiber public network that includes fiber-based access at either end of a business-to-business link — the fiber needed to support SONET and Switched Multimegabit Data Services and to launch this country into the future? Where's the ubiquitous infrastructure of data-grade shielded twisted-pair wiring that will let every business install Fiber Distributed Data Interface economically and reliably right now? Where's the end-to-end electronic mail infrastructure supporting not only messaging but also sophisticated file transfer?

I don't know how the government can stimulate the building of these electronic highways, especially given the private-company nature of the communications markets.

But it seems very clear that if the government not only wants to create jobs, but more importantly, create a new infrastructure on which decades of economic growth can be built, one area that cannot be overlooked is the electronic highways of the 21st century.

This issue should be on the table now so that, in the next century, our manufacturing companies can stay competitive, our halls of learning can extend into our business offices and living rooms, and our sellers and buyers can meet "face-to-face."

Davidson, a voice and data consultant, is editor of FAXreporter, *a newsletter for Buyers Laboratory, Inc., in Hackensack, N.J.*

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EDITORIAL

Shedding new light on the role of LANs in the enterprise

This being the week of NetWorld 92 Boston, it's a good time to update readers on some LAN-related projects in the works here at *Network World.*

First, we're pleased to welcome two new members to our User Advisory Panel. Panel members, who represent a range of user groups and industries, actively help shape our editorial product.

Our new members are Byron Comp, president of the Association of Banyan Users International and network administrator for Precision Systems, Inc. in St. Petersburg, Fla., and Laura Swanton, president of NetWare Users International and manager of technical services for Bryant Universal Roofing, Inc. in Phoenix.

Comp and Swanton represent two of the largest local-area network user groups and understand the needs of users trying to weave LANs into the enterprise network.

We're also pleased to announce that we'll be working with AT&T Bell Laboratories on a series of tests examining frame relay products. Frame relay promises to be useful for LAN-to-LAN networks, and the tests will give readers an inside look at how the technology works.

The tests will be conducted at Bell Labs facilities by their own personnel with the assistance of technical experts from Telenex Corp. and Wandel & Goltermann Technologies, Inc., two leading test equipment makers. Products to be tested include routers, frame relay switches and frame relay assembler/disassemblers. Last year, *Network World* and Bell Labs cosponsored tests of products supporting the Simple Network Management Protocol.

We're also involved in some important conferences on key LAN issues. *Network World* is the official publication sponsor of the GroupWare '92 conference being cosponsored by Lotus Development Corp. and SRI International. The conference will be held Aug. 3-5 in San Jose, Calif., and will explore many of the software issues facing LAN users today. For more information, call (415) 282-9151.

We're also cosponsoring the Client-Server World Conference in Boston with Digital Consulting, Inc. from June 29 to July 1 as well as the Downsizing Expo in Chicago from March 10-12. For information, call (508) 470-3870.

Additionally, we're cosponsoring Boston University's Downsizing/Rightsizing International Conference and Exposition in Los Angeles from April 27-31. For information, call (508) 649-6926.

We hope that these undertakings will shed new light on the role of LANs in the enterprise network.

OPINIONS

INTERNATIONAL ISSUES

BY STUART BROTMAN

Russian telecom needs shake-up to attract investors

One of the critical challenges facing the new Commonwealth of Independent States (CIS) is how to balance the central planning beliefs of the former Soviet Union with the new notions of sovereignty among the republics. One test that will determine whether the CIS is closer to resolving differences among the disparate republics is how future telecommunications planning is organized.

The massive improvement of voice and data transmission lines within and among the republics is a prerequisite to attracting private enterprise. Without adequate telecommunications facilities, it will be difficult — perhaps impossible — to instill confidence in foreign investors.

Telecommunications capabilities are a tremendous source of competitive advantage among Western businesses. The inability to have people, computers and facsimile machines talk to one another could mean the difference between supporting CIS development or writing it off as a hopeless undertaking.

Before its collapse, the Soviet Union had a telephone penetration ratio of 13 phones per 100 citizens, a little above the global average but well below the U.S. ratio of 79 phones per 100 homes.

Prodded by perestroika, the Soviet Union began several initiatives enabling the country to be more connected to the rest of the world. Since 1987, for example, Soviet citizens have been able to direct dial their international telephone calls, which represented a dramatic break from the norm of those calls being cut off by government intermediaries.

The most ambitious telecommunications legacy of Mikhail Gorbachev was the adoption of a national telephone provision plan, with the goal of a phone in every Soviet home by the year 2000. This translates into roughly 90 million to 100 million new telephones, not to mention the need to triple the transmission capacity of the telephone network itself.

The formation of the CIS raises questions regarding the continued implementation of this plan. On one hand, the goal of expanded internal and international telecommunications capabilities becomes even greater now that the move toward capitalism has accelerated rapidly. On the other hand, will it be possible to realize such lofty designs without some aspect of central planning?

> There is considerable merit in allowing the republics to formulate their own plans.
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If the CIS wants to instill confidence among Western governments and investors, it must send clear signals — the sooner, the better — regarding how and when it will upgrade its telecommunications infrastructure.

There is considerable merit in allowing the republics to formulate their own telecommunications plans because local officials are well positioned to make investment and rate decisions for their regions.

Azerbaijan, for example, a center of violence during the final years of the Soviet Union, has established an international telephone exchange with Turkey as a means to promote communication among cultures.

However, too radical a shift in favor of republic autonomy may not produce optimal results. Despite the spirit of democracy, Russian President Boris Yeltsin must assert a more forceful presence within the CIS by delegating responsibilities among those close to him for managing investment and rate setting for intrarepublic long-distance telecommunications.

Some centralized coordination must also be put in place so that Gorbachev's telephone provision plan can move ahead, albeit behind schedule by a decade. This centralized coordination should create investment and rate-setting plans for interrepublic and international communications so that Western businesses can tap into the CIS market as a whole, instead of piecemeal in each republic.

In my opinion, republic autonomy, coupled with some necessary residual central planning, is the best route to follow. Republic telecommunications authorities should bring in partners to upgrade their facilities, rather than rely on costly cross-subsidies, thus hastening the overall transition to a marketplace economy.

These authorities should also be able to take advantage of economic efficiencies that CIS telecommunications facilities can offer, provided that the confederation is willing to recover only the cost of these facilities rather than create an enforced profit center that promotes Russian dominance and further reliance on central planning.

If Yeltsin can balance these two forces successfully, the results of telecommunications improvement would generate monetary and political capital. And the Western world would see that there is a tangible basis being established for future investments.

Equally important, the sense that the CIS can work to promote mutual interests would finally hit home, lessening global anxiety about what the post-Soviet Union environment can achieve. ◘

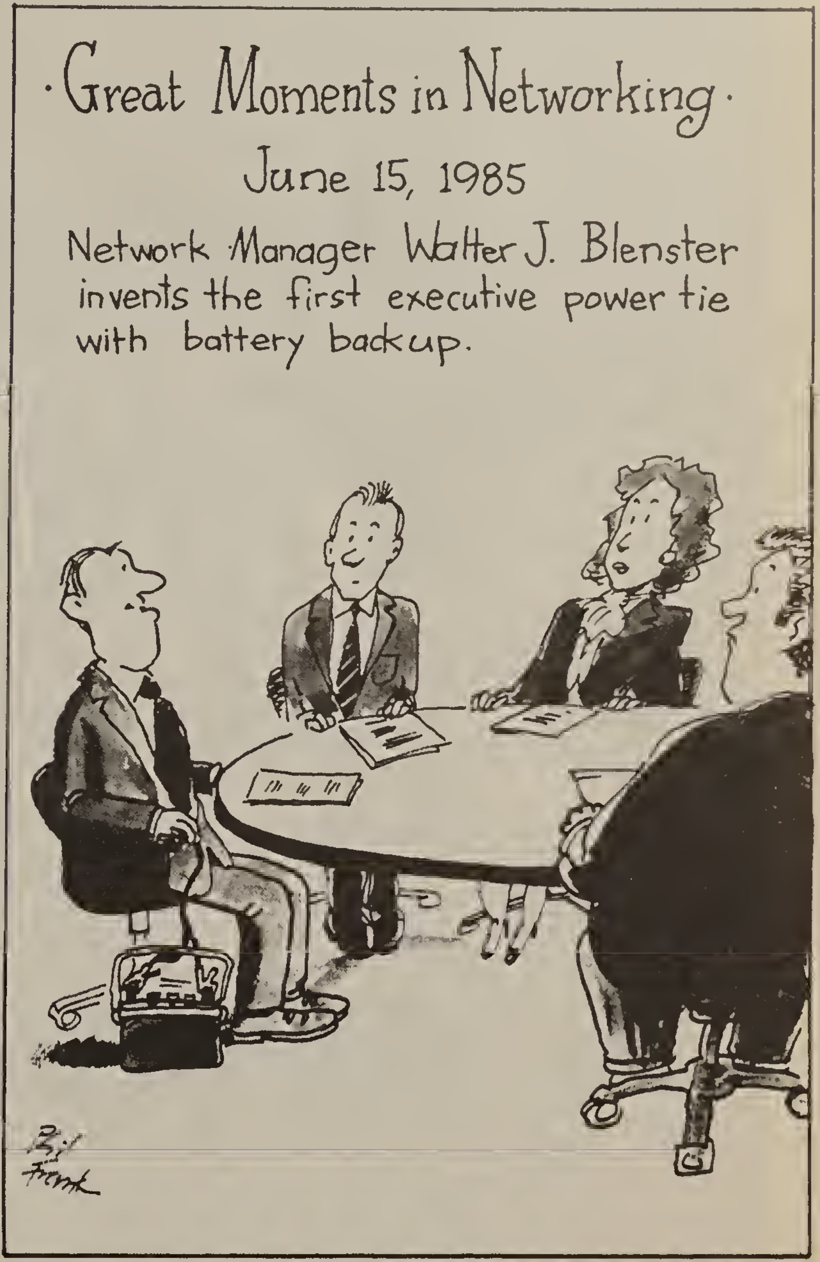
Brotman, a Boston-based lawyer and management consultant, teaches international communications law and policy at Tufts University's Fletcher School of Law and Diplomacy.

ATTENTION LAN SERVER VENDORS: *Network World* would like to list your product in a Buyer's Guide on April 6. We'll include only preconfigured PC- and minicomputer-based communications and file servers. The products must include CPU, disk storage subsystem, network interface card and network operating system software.

To obtain a survey form, call Alison Conliffe, associate features editor, at (508) 875-6400 or Mike Hurwicz at (206) 376-5773.

TELETOONS

BY FRANK AND TROISE


·Great Moments in Networking·
June 15, 1985
Network Manager Walter J. Blenster invents the first executive power tie with battery backup.
By Frank

LETTERS

Test article falls short

I consider your publication to be perhaps one of the most respected and widely read in the industry. However, in my opinion, your recent article "Test shows which NOS performs best for you" (*NW,* Jan. 20) was superficial and inaccurate, and poorly served the needs of your readers.

The decision of which network operating system to buy involves judging many criteria. Of course, the primary reason to buy a network operating system is the performance of its file-sharing feature. But in the types of networks your readers have, features such as electronic mail, printing and gateways into mainframe environments are just as critical.

To inexperienced network managers reading your article, it might appear, for example, that Microsoft Corp.'s LAN Manager is the right choice. But if 70% of their users have to access a mainframe, their response time is going to be very different with various products. Printing speed is also an issue. Spooling takes time, and different network operating systems transmit differently depending on the network topology. In addition, speeds depend heavily on the network hardware, and certain cards and drivers permit faster performance.

It's difficult to simulate the much-touted real-world performance of a network. But it cannot be done with five personal computers. There is more to it than "emulating load." The number of transmitting stations is at least as important as load level. On an Ethernet, this affects the collision rate, which can slow the entire system. On a token ring, the number of transmitting stations affects overall

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Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

Opening Windows to the network

Users must overcome conflicts with add-on products and memory to network Windows

ILLUSTRATION ©1992 DAVID OLSSON

Every once in awhile, something truly phenomenal comes along to seize users' interest. Take Microsoft Corp.'s Windows 3.0, for instance. After the windowing software with its powerful graphical user interface was introduced last year, millions of users rushed out to buy their own copies.

Unfortunately, when they began working with those programs, many network managers had trouble getting Windows to work on their networks.

The initial difficulties gave Windows 3.0 a bad name. Indeed, a *Network World* survey last year documented that fact ("Survey: Drawing a bead on net managers' top concerns," *NW,* June 3, 1991). The article showed that only about a third of net managers at the time were using Windows in a networking environment. What's more, among the managers who dared to use Windows, 27% said it caused network performance problems, and 29% said they were having trouble using Windows with their network operating system.

Fortunately, those difficult early days have passed. After ironing out initial compatibility problems with Windows, many net managers are now making Windows useful in their networking environments.

Their bad experiences can help others avoid similar pitfalls. Net managers say problems with Windows fall into two categories: those that occur when trying to get Windows to run for the first time on a network and those that occur during the normal course of operations while running Windows on a network.

Often, the problems concern conflicts between Windows and another product — either a software application or hardware. For example, net managers frequently want to access resources that use different network protocol stacks.

A user may need to toggle between an application running under Novell, Inc. NetWare —

(continued on page 51)

Salamone is features writer for Network World.

By SALVATORE SALAMONE

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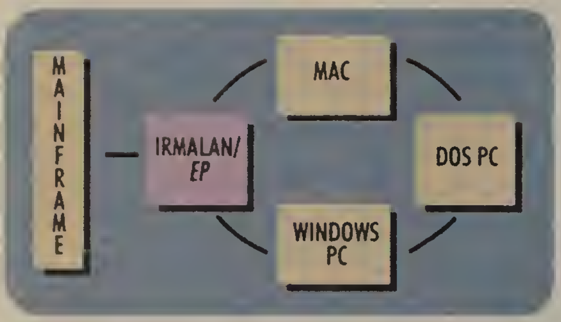

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**Windows client software is not yet available for the Novell IPX/SPX protocol.* *©1991 Digital Communications Associates, Inc. All rights reserved. DCA is a registered trademark and IRMALAN, MacIRMALAN, IRMA, and RamXpander are trademarks of Digital Communications Associates, Inc. All other brand and product names are trademarks or registered trademarks of their respective owners.*

Circle Reader Service #118

(continued from page 48)

which transmits Novell's Internetwork Packet Exchange (IPX) across the local-area network — and a session on a network that uses the Transmission Control Protocol/Internet Protocol — which must transmit IP across a LAN to a wide-area net. To accomplish that, the personal computer must transmit both protocols across the LAN, but it may not be set up for this.

Solving the problem of dual stacks varies from card to card, but it often involves loading additional network interface card (NIC) driver software. Simply changing the driver software does not solve the problem. However, several products have been introduced in recent months to help net managers perform this swapping (see "Connecting to hosts through Windows," page 53).

Where's my memory?

Another problem that occurs when trying to run Windows on a LAN is conflicts over the allocation of memory space between Windows and both NICs and video adapter cards. A NIC or video adapter card might allocate a portion of random-access memory that is also allocated to be used by Windows.

> "Identifying the source of the problem is the hard part," Farrar says. "It's not always easy finding the conflict."
>
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Similarly, devices such as a serial mouse may use the same communications ports or interrupts that Windows has set aside for its use. However, these conflicts are not only relevant to stand-alone users. If they occur while a user is conducting a networking task — even a simple one such as printing — the devices will not work because of the time that Windows needs to access the communications port.

Net managers only need to resolve these conflicts once. After that, the problems will not reoccur. However, solving them is often quite challenging.

For instance, net managers may simply receive a generic error message, such as "Cannot load Windows," the first time they run Windows on the LAN. They must then use their own resources to discover the source of the problem.

"Identifying the source of the problem is the hard part," says Susan Farrar, director of academic computing services at Collin County Community College in Plano, Texas. "It's not always easy finding the conflict."

Isolating the problem can be time-consuming. It can take many calls to Microsoft as well as NIC and video adapter card vendors. In many cases, net managers call vendor bulletin boards and ask whether others have experienced the same problem.

Sometimes the solution can be relatively simple. Net managers may just have to instruct Windows not to use a particular block of upper memory that is being used by the NIC or video adapter board.

To exclude a memory block, net managers simply need to add one line in the SYSTEM.INI file, which contains global system information that Windows uses when it starts.

However, sometimes the problem is not with memory conflicts, but rather NIC drivers. If the NICs are more than a year old, they may not have the correct drivers to work with Windows. New NIC driver software is commonly available on vendor bulletin boards.

Although it is not easy to solve these problems prior to running Windows on a LAN, there is a knowledge base of user experience that has been built up to help in this area. "Dialing into bulletin boards and perusing the messages or libraries can save net managers from reinventing the wheel," says Stephen Saxon, a Certified NetWare Engineer and Certified NetWare Instructor as well as author of an upcoming book about running Windows on Novell NetWare.

This is particularly true when it comes to finding information about how to get Windows running with a network operating system.

When Windows 3.0 was first released, net managers already running NetWare had to update their NetWare shell programs such as NET3.COM. However, net managers running versions of NetWare that are more than a year old will have to get new NetWare shells if they plan to run Windows. The new shells for Windows can be downloaded from Netwire, Novell's electronic information service. CompuServe, Inc. users can access Netwire simply by typing GO NOVELL.

Netwire, considered one of the best information sources on NetWare and Windows problems, is where many net managers found that others shared their problems when Windows was first introduced. (During the first six months after Windows 3.0 was introduced, Novell developed at least five versions of the NetWare shell programs.)

But the issue of NetWare shells has been settled; new shipments of NetWare have the updated shells.

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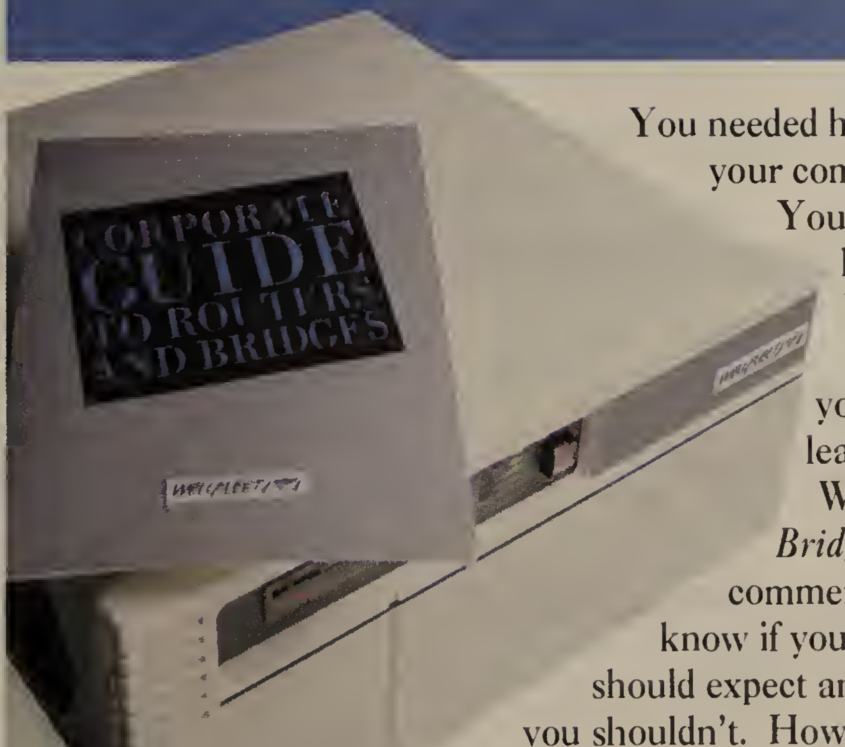

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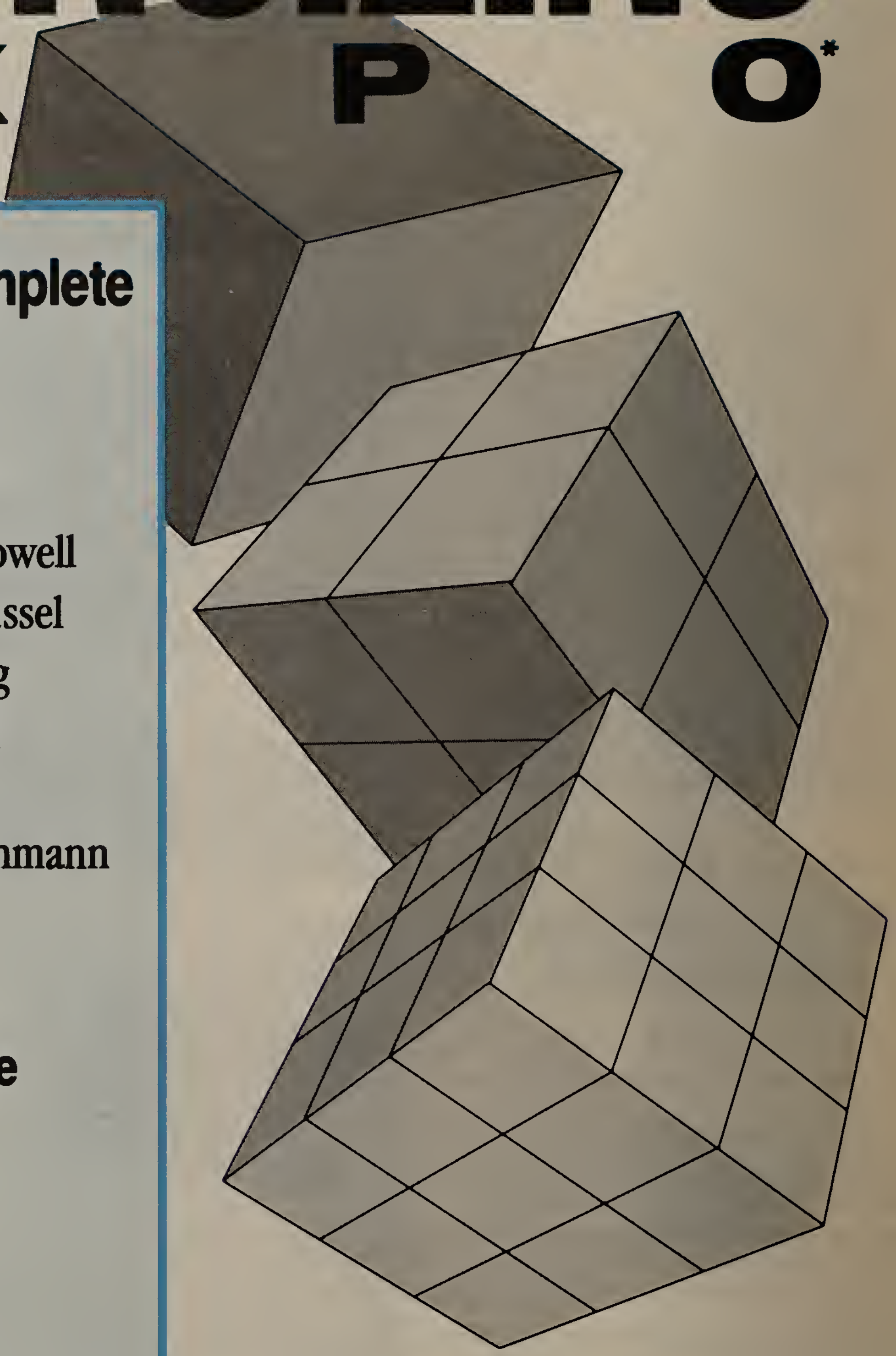

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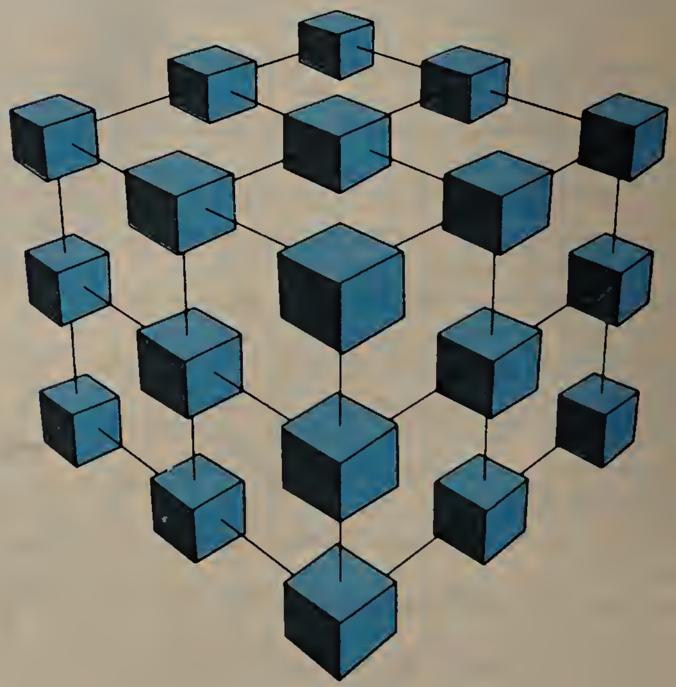

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(continued from page 51)

"In the last six months, things have stabilized," says Stan Levine, president of Automated Design Systems, Inc., an Atlanta independent software developer of LAN Windows utilities. "If you have an old copy of NetWare, you may still have some problems. But you can get new shells from Netwire."

Another problem in getting Windows to work with a network operating system involves Arcnet LANs. Users trying to install Windows on Arcnet LANs using Windows' default settings cannot get the program to run. This led to many reports claiming that Windows can't run on an Arcnet LAN. "This was [not true]," Saxon says.

Windows' documentation covers the proper way to install Windows on an Arcnet LAN, he says. However, many users have complained that the documentation for Windows is generally hard to follow. Some of the information is only available on-line in the form of text files, which may have led to the misunderstandings about Windows and Arcnet.

Windows in, DOS out

Net managers are beginning to understand the problems that they will face when trying to get Windows to work on a LAN for the first time.

Once the issues are worked out for net managers' own hardware and network operating systems, they must turn their attention to getting the applications to run on the network.

Often, the problems with getting software to run on networks in conjunction with Windows show up as unrecoverable application errors. These errors can be caused by insufficient memory or when running applications designed for a previous version of Windows or DOS.

Modes of operation

	Real Mode	Standard Mode	386 Enhanced Mode
Minimum CPU	8088 or better	80286 or better	80386 or better
Minimum RAM	384K bytes of conventional memory	192K bytes of extended memory	1.024M bytes of extended memory
Performance	Slowest operation mode; swaps portions of programs in and out of RAM when memory is low.	Fastest operation mode; cannot multitask due to 80286 chip.	Multiple DOS applications can be multitasked in the background; allows use of virtual memory on hard disk, which is less expensive than adding more RAM.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

There are also recurring problems when a company uses a mix of Windows- and DOS-based applications. And if there are terminate-and-stay resident (TSR) programs that are also being run, the problems can be exacerbated.

Systems integrators suggest that if you have the opportunity, use only Windows-based applications. "Using Windows- and [DOS]-based applications together is the worst of both worlds," Levine says. "The real key to getting Windows running on networks is to standardize on Windows applications."

According to Sam Adicoff, president and cofounder of San Jose, Calif.-based Novell Platinum reseller PC Edge, Inc., even when a firm settles on a standard set of programs it will support under Windows, some end users simply cannot live without their favorite TSR program. And many companies have a substantial investment in their DOS-based applications, so a quick move to all Windows applications may not seem financially sound. However, a deeper analysis of the costs might uncover that the switch can be cost-justified.

"The time required to get DOS applications running should be factored into the decision," Adicoff says. "[Net managers] can spend 80% of their time trying to tweak DOS applications to run under Windows," which can add up to a lot of money in a short time. So the investment in all Windows-based applications could actually save money.

Moving to Windows

Reducing the problems of networking Windows can be accomplished in ways other than standardizing on Windows applications. Those familiar with the process of installing Windows on networks say there are several steps net managers should take when making the move.

Many network performance problems are related to Windows swapping files and managing memory. When Windows has trouble handling these tasks, users often get an unrecoverable application error or their screen doesn't change for what seems to be a long period of time.

Net managers can head off some problems in this area by investing in hardware. "Buy as much computer as you can afford," Saxon says.

Technically, Windows can run in Real Mode on a PC with an 8088 CPU, but the performance is dreadful.

Windows can run in three modes: Real Mode, Standard Mode and 386 Enhanced Mode (see graphic, this page). With an 80286-based PC, Windows can run in both Real and Standard Modes. But again, the performance may suffer.

"Don't try to force Windows to run on an older machine," Adicoff says. "You can spend hours trying to get everything to run."

Sometimes it's cheaper to buy a new machine than to spend the time working with an inadequate machine. "If you spend six hours trying to get one PC to run a Windows application, it's cheaper to buy a new one," he adds.

Once the PC selection is made, choosing Windows' operation mode can greatly influence performance. When required, Real Mode manages memory by swapping portions of a program in and out of conventional RAM. This swapping greatly degrades Windows performance, according to Levine.

If a company does not standardize on Windows applications, it can run DOS applications using Standard Mode. This requires an 80286 processor or higher and uses extended memory. Standard Mode is the fastest of the three Windows operating modes; however, because of the limitations of the 80286 microprocessor, Standard Mode cannot multitask DOS applications in the background.

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Connecting to hosts through Windows

Many net managers want to use Microsoft Corp.'s Windows 3.0 to enable client workstations to reach beyond local-area networks. Ideally, they'd like to configure Windows so a user can click on an icon and be connected to the Internet, an electronic-mail service or a remote host computer.

These connections are often made using the Transmission Control Protocol/Internet Protocol. While there are many products that allow a personal computer or workstation on a LAN to access TCP/IP resources, it wasn't until recently that vendors introduced products that enable users to make the same connections from a PC or workstation running Windows.

The difference between the DOS and Windows versions of these packages is that the Windows version must allow the user to toggle between applications that use different protocols. For example, a user might be connected to a Novell, Inc. NetWare LAN server in one Window and to a Unix host in another.

In many cases, the user might not be able to go from one Window to the other without rebooting the PC. The software packages introduced over the past two months overcome this problem by enabling the PC to switch from one network protocol stack to another when toggling between windows.

For example, FTP Software, Inc. of Wakefield, Mass., which has a strong foothold in the DOS-based TCP/IP file-transfer software marketplace, rearchitected its product for the Windows environment and introduced PC/TCP for DOS Version 2.1.

This product can perform in simulated multitasking environments such as Windows 3.0. A Windows virtual device driver allows multiple PC-based TCP/IP applications to run concurrently in different windows.

In January, Seattle-based Spry, Inc. introduced Spry Concurrent for NetWare. When used in conjunction with its Air for Windows product, it gives Windows 3.0 users access to devices using different network protocols as well as multiple TCP/IP sessions under Windows. The combinations allow a user to run as many as four protocols in four Windows sessions simultaneously.

Besides TCP/IP, other protocols supported include the Network Basic I/O System and protocols for commonly used network operating systems such as NetWare, Banyan Systems, Inc.'s VINES and Microsoft's LAN Manager.

Also in January, Distinct Corp. of Saratoga, Calif., upgraded its Distinct TCP/IP for Windows network applications kit to include a "drag and drop" file-transfer utility. In 1989, Distinct offered TCP/IP for Windows 2.0.

The product has been upgraded for Windows 3.0 and allows net managers to develop applications where both ASCII and binary files can be transferred over LANs and wide-area networks by tagging files or entire directories and dragging them with a mouse to a destination directory.

Local and remote systems are represented graphically in the Windows display, and the end user simply has to perform the drag and drop for the files to be transferred. This hides the complexity of the procedure from the end user.

As Windows applications on networks become more prevalent, additional products will appear from third-party vendors.

— *Salvatore Salamone*

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For those with Intel 80386-based PCs, the 386 Enhanced Mode is recommended for running Windows with existing DOS applications. It enables multiple DOS programs to be multitasked in the background and allows net managers to use virtual memory, which is set aside on a hard disk.

The 386 Enhanced Mode is not as fast as Standard Mode but can be less expensive. Virtual memory is an inexpensive method of supplementing a PC's memory. Rather than adding expensive RAM, the hard disk-based virtual memory can be used.

Besides selecting the best mode under which to run Windows, net managers can improve performance and eliminate many problems if they learn the intricacies of managing extended memory.

"Have a good foundation in memory management," Adicoff says. "This will save time when configuring Windows for end users."

For example, a knowledge of memory management can save time when diagnosing memory conflicts between Windows and applications, NICs and video adapter cards.

Human factors

Windows can be a productivity booster in many settings. Users unfamiliar with command-line instructions can access network resources, such as printers or databases on other computer systems, simply by using the mouse to click on an icon.

For example, the system can be configured so a user can send electronic mail or exchange files with a remote computer without knowing how to make the connection to another device.

However, productivity can drop when using Windows if proper care has not been taken to ensure that end users like the system. For example, when using a word processing package such as WordPerfect Corp.'s WordPerfect, the text in a Window might be so small that users are forced to slow down and strain to see the text.

"With a DOS application, you get about an 8-in. display, [but] with Windows and a [video graphics adapter] monitor, it's about a 6-in. display," says Mark Morris, vice-president of software engineering at IMAGEngineering, Inc. in Westerville, Ohio. For that reason, many systems integrators recommend that companies use SuperVGA monitors when running Windows. Many users purchase SuperVGA monitors and video adapter cards because of their high resolution (higher than VGA) and they offer more multicolor display.

But that's not the reason why net managers should buy them for Windows workstations. "With SuperVGA, you can fit more on your screen," Saxon says. "You get enough room on the desktop to get things done."

Putting it into perspective

Before you install Windows on a network, sit back and evaluate the benefits you believe Windows will provide. You may be surprised to find there are few.

"We like to do a sanity check first," Adicoff says. "If a company is not running any Windows applications and the end users are well trained on the existing applications, Windows may not be the right solution today."

Net managers can improve performance if they learn the intricacies of extended memory.

▲▲▲

Morris says, "If you are running all DOS-based applications and using primarily 80286-based machines, Windows is probably not for you."

However, if Windows is the right approach, there is some hope for dealing with the problems of networking Windows.

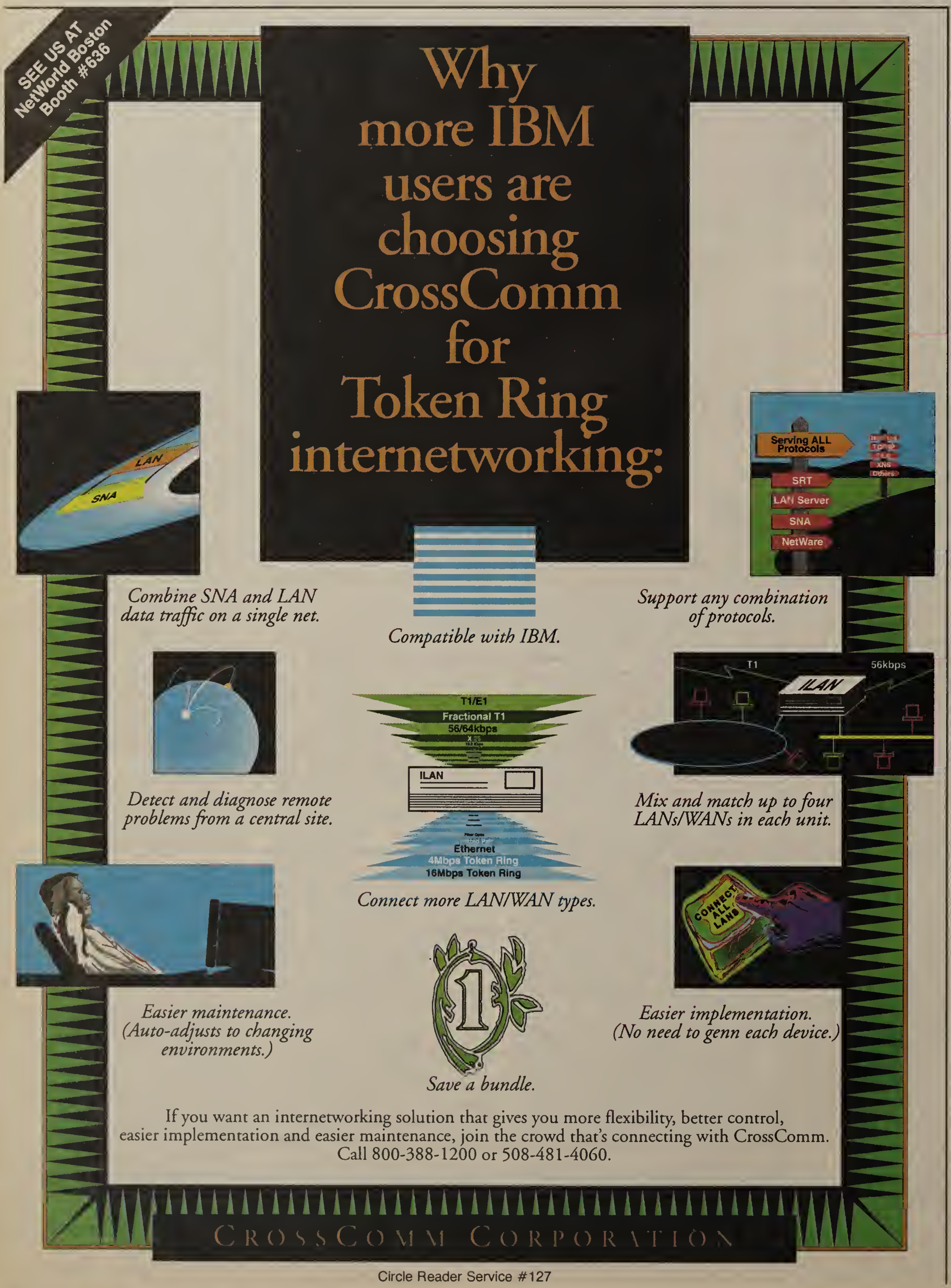
A year after the introduction of Windows 3.0, net managers have become experienced in tackling network-related Windows problems. And Microsoft will soon roll out Windows 3.1 and eventually release Windows NT, the server-based version of Windows 3.0, as well as subsequent versions of it. Both will make it easier to run Windows on a network.

For example, the installation process for Windows 3.1 has been changed with the net administrator in mind, according to analysts who have been briefed by Microsoft. They also claim that Windows 3.1 is "more bulletproof." It will enable the user to exit Windows and get to DOS without rebooting the PC when Windows hangs it up.

With Windows NT, which is planned to be a 32-bit server operating system, Microsoft will make the task of using Windows on a network easier for end users. It is also likely to be less difficult for net managers to work with than interfacing Windows 3.0 to existing servers.

Microsoft will provide application program interfaces (API) so that other software companys' applications can tie into Windows more easily. For instance, a database management system developer can design its front end so it works in conjunction with the Windows NT APIs.

Microsoft also plans to make Windows NT work more easily with WANs as well as LANs, all of which means that the task of networking Windows is likely to continue for years. ◼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Forcing the fit

With SNA here to stay, making it fit with a LAN internetwork is no easy task.

CONTINUED FROM PAGE 1

connected local-area networks in the same breath today. No longer do we hear dire predictions about the imminent demise of SNA at the hands of LAN internetworks.

In fact, SNA will continue to hold sway as a tried-and-tested protocol for linking terminals to IBM mainframe-based applications. The quintessential hierarchical SNA requires Network Control Program (NCP) software on a front-end processor and host-based VTAM software to perform routing functions.

SNA is being rejuvenated thanks to Advanced Program-to-Program Communications and Advanced Peer-to-Peer Networking (APPN) software, which together make it a very contemporary and host-independent networking scheme. APPC provides transparent links between applications running on different SNA devices. APPN off-loads some SNA routing tasks from NCP and VTAM to cluster controllers and end nodes.

Recent surveys confirm SNA remains the most popular primary wide-area network protocol in the commercial sector. For example, a late 1991 survey of 400 LAN administrators by Business Research Group, a market research firm in Newton, Mass., shows 73% of respondents citing SNA as their primary protocol. This put SNA comfortably ahead of Digital Equipment Corp.'s DECnet, the next most popular protocol as cited by 20% of the respondents. TCP/IP was the third most popular protocol, named by 10% of respondents.

Even still, SNA is no longer the only networking scheme of importance in the most ardent and committed true Blue shops. Traditional host- or minicomputer-based applications are being complemented by — and, in some cases, usurped by — LAN-based client/server applications.

Many of these client/server applications are implemented using the communications facilities of LAN operating systems, including the Network Basic I/O System found in IBM's OS/2 LAN Server, Internetwork Packet Exchange (IPX) found in Novell, Inc.'s NetWare, and TCP/IP.

In fact, midsize to large enterprises support a multitude of protocols to perform different functions (see Figure 1, page 62).

Therefore, it is not unusual to have NETBIOS-, IPX- and TCP/IP-based applications running on the same token ring or Ethernet. These higher layer protocols are simply wrapped within token-ring or Ethernet packets and shipped across a LAN.

It is also easy to route these protocols across a LAN internetwork. Routers examine the originating and destination addresses of incoming packets and consult a routing table to determine how to route them.

SNA traffic can likewise be wrapped within token-ring or Ethernet packets for transmission across a LAN. In fact, SNA can utilize a variety of physical media types and data link control protocols, which comprise the first and second layers of the seven-layer OSI model. SNA can run across such media types as coaxial cable, twisted-pair wire, fiber optics and multiwire cable used in bus and tag connections. SNA

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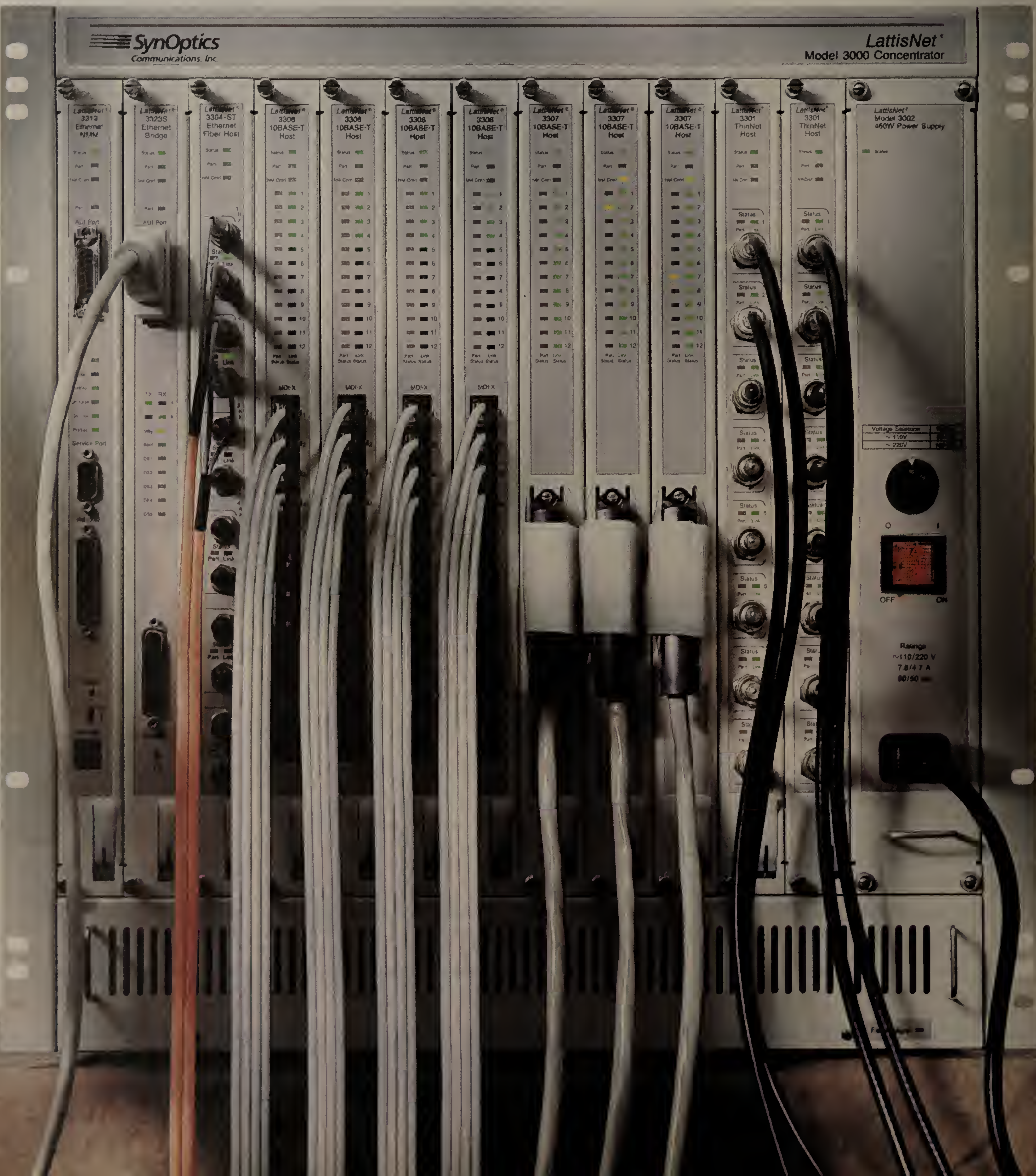
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also utilizes data link protocols such as IBM's System/3x0 mainframe channel link protocol, Synchronous Data Link Control and X.25, as well as Ethernet and token ring.

SNA backbones, including those supporting the nascent APPN, take on a more proprietary flavor at Layer 3 of the OSI model, the network layer. Traditional SNA routing is performed on a subarea basis with each subarea comprising an IBM host with VTAM or front-end processor with NCP and associated peripheral nodes such as cluster controllers, Application System/400 minicomputers and personal computers.

Each SNA logical unit, such as a terminal, application or I/O device, is given a name. Each time the network is restarted or dynamically reconfigured, the logical unit is dynamically assigned one or more network addresses within the subarea in which it resides. Due to the dynamic allocation of addresses, only VTAM now has access to directories containing the information needed to convert a logical unit name to the corresponding address. This conversion is required to establish a session between logical units over an SNA Virtual Route (VR).

Once a VR between subareas has been selected by VTAM, front-end processors are able to forward data traffic generated during the session along this route without further intervention from VTAM.

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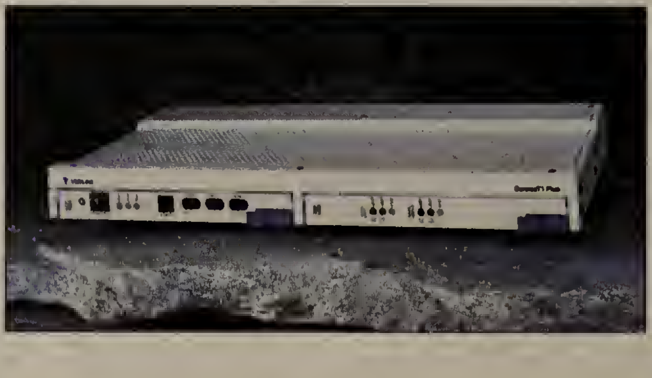

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Today's routers cannot perform NCP- and VTAM-like functions. Thus, SNA traffic on LANs can only be bridged across wide areas to an SNA gateway, such as a front-end processor, AS/400, 3174 cluster controller or mainframe channel-attached 3172 Interconnect Controller that provides access to an SNA backbone or host. Likewise, SNA networks cannot transport most LAN protocols.

This has been the rub in integrating SNA and LANs. Nobody is likely to claim the marriage of SNA and LAN traffic on a single network was one made in heaven. For the time being, this pairing is more in the frictional, crash-bang-wallop mold of a Tom and Jerry cartoon than the homogeneous serenity of a Barbie and Ken dollhouse.

Fortunately, most — if not all — of today's schism between the two can be attributed to shortcomings in IBM's current implementation of SNA, rather than to any intrinsic flaws in the networking architecture itself.

Dreaded parallel nets

Because of an annoying absence of generalized support for LAN traffic across SNA backbones — including APPN-based networks — many enterprises are forced to implement and maintain what has become the bane of today's commercial enterprise: the dreaded parallel SNA and LAN internetwork backbones. One is an SNA backbone for supporting host-based applications. The other is a bridge- or bridge/router-based multiprotocol backbone for interLAN traffic (see Figure 2, page 62).

This dual-backbone approach works but at the unacceptable and undesirable expense of installing, maintaining and operating two very diverse networks. In some instances, the duplication of long-distance links can be alleviated by carving out separate channels on a T-1 network or even a frame relay network in the future. While it eliminates physical links, this approach creates logical networks that must be managed separately and cannot share idle bandwidth.

IBM has taken some steps to permit LAN internetwork traffic to flow across SNA backbones. Some limited NETBIOS transport across SNA backbones can be achieved with IBM's LAN-to-LAN Wide Area Network Program, which encapsulates NETBIOS traffic within LU 6.2. However, the software must run on OS/2-based gateways at both the sending and receiving sites.

IBM's NCP Version 6, which is expected to be available in September, will offer the ability to transport TCP/IP traffic across an SNA network. This will be accomplished by encapsulating TCP/IP in SNA. Subject to

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throughput requirements, this facility could be theoretically exploited to interconnect multiprotocol routers across SNA networks — a fact reiterated by IBM last month at the announcement of its 6611 Network Processor router.

But there appears to be much more interest in routing SNA traffic across LAN internetworks. Much to their credit, many bridge and bridge/router vendors — including Cisco Systems, Inc., CrossComm Corp., Wellfleet Communications, Inc. and even IBM — rushed to the rescue of enterprises balking at the thought of the dreaded parallel networks.

The answer?

The initial — and intuitive — solution was to bridge SNA traffic across LANs while bridging or routing other LAN protocols. Now, at least in the case of LAN traffic, it would be possible to have a single, universal backbone that interconnects multiple and dispersed locations. This would permit both LAN-based SNA and non-SNA LAN traffic to be freely transported between various LANs (see Figure 3, page 62).

Though appearing at first glance to be utopian, solutions restricted to just bridging LAN-based SNA traffic can prove to be far from complete. For starters, more than half the installed base of SNA devices are still link-attached and use such protocols as SDLC, 3270 Binary Synchronous Communications and X.25. As such, these devices are excluded from any approach that caters to LAN-attached SNA devices.

To address this, most leading bridge/router vendors now offer a synchronous passthrough option that enables users to configure a dedicated circuit path through a router network to a front-end processor.

Vexed issue of SNA routing

What is needed are routers that can route SNA. Contrary to the "SNA is not routable" catchphrase circulated widely within the internetworking community last year, SNA has always been routable. How else could intercontinental SNA networks serving in excess of 10,000 users be built?

Routing agents need to be imbued with intelligence about SNA's routing procedures and protocols. They must also intercept, decipher and act upon routing information in the SNA Transmission Headers that prefix all SNA message units, the equivalent of LAN packets.

In SNA, routing is performed by Subarea Nodes including Type 4 devices, such as a front-end processor, and Type 5 devices such as a System/3X0 host.

None of today's crop of bridge/router vendors, including IBM, intend to provide a true SNA routing capability. Cisco investigated introduction of a router that could emulate a Type 4 device, but the company is no longer pursuing this technically nontrivial product development.

Enabling routers to emulate all the functions of a Type 4 device — including congestion control, Transmission Group management and certain SNA management services — requires adding more processing power to existing routers.

IBM could obviously elect to do such an emulation on its much vaunted multiprotocol router, the 6611.

However, if for no other reason expect to protect its diminishing income, it appears IBM will continue to only offer true SNA routing on its current and future front-end processors. The only exception may be in adding some routing capabilities to APPN.

Is APPN the solution?

Eschewing traditional SNA routing, many router vendors are following the lead IBM established with the 6611. They hope to offer APPN Network Node routing on their products once IBM follows through on its promise to license what was up to now a proprietary specification.

APPN routing is based on a broadcast search destination location technique. It is roughly analogous to the widely, if unreasonably, condemned and supposedly broadcast-storm generating explorer packet approach used by token-ring source route bridging (SRB).

Broadcast search is a much more dynamic, straightforward and, therefore, simpler-to-implement routing scheme than the one used by SNA. Ironically, it does not yet support adaptive routing, nor dynamic alternate routing — quintessential features of existing routers.

APPN Network Node routing is, nonetheless, still a more compelling solution for router vendors than that of traditional SNA.

The key issue at stake is trying to estimate when SNA users will start to cut over to APPN at a significant and steady rate. It is safe to assume this is unlikely to be within the next 18 months.

APPN's support for the 3270 data stream, now being informally promised by IBM for next year, is a prerequisite for most users contemplating migration to APPN. Taking into account evaluation cycles and the potential need to upgrade or replace certain equipment in order to accommodate APPN, it is unlikely that even 1993 will be the Year of APPN.

In the absence of routers capable of performing true SNA routing and the limited availability of APPN Network Nodes, SRB remains the basis for integrating SNA traffic on LAN internetworks.

SRB has been a standard feature of the token-ring architecture from day one. It enables multiple token rings, whether physically adjacent or geographically dispersed, to be uniformly interconnected to

(continued on page 62)

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(continued from page 61)

form a single, consolidated LAN. This makes it easy for PCs on one token ring to access resources like other PCs, file servers and printers on another token ring.

SRB is used to interconnect multiple token rings containing PCs and other workstations requiring access to an SNA Gateway that feeds traffic into the core SNA environment. Doing this enables NCP, VTAM and, consequently, host application software to view and treat LAN-attached nodes as if they were directly attached to a single SNA link.

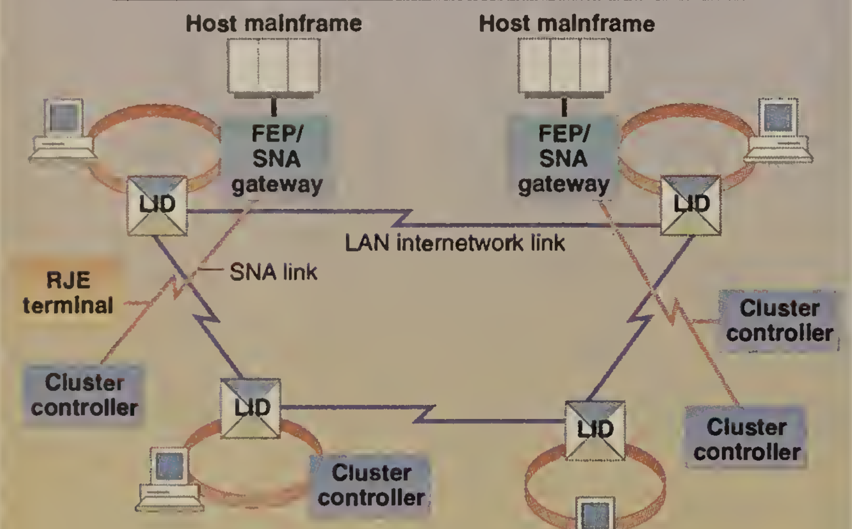
SRB is a direct, globally applicable and fully IBM-endorsed bridging technique. Like all bridging techniques, SRB is a protocol independent process. It occurs at the data link layer and can be transparently used with any SNA application.

SRB relies on a dynamic broadcast search to determine the location of a remote destination. A source device initiates a broadcast search by generating an explorer packet on a single-route or all-routes basis. As the explorer packet traverses the network, it records the addresses of the bridges through which it passes.

The destination device returns a search response to the originator, which typically decides to use the route indicated by the first response it receives and inserts the routing information contained in that response in all subsequent frames it transmits.

The dreaded parallel backbones

Figure 2



FEP = Front-end processor
LID = LAN interconnection device RJE = Remote job entry

While SNA traffic can be bridged between token-ring LANs that support an SNA gateway, users with SNA and LAN internetwork traffic must still build parallel backbones.

GRAPHIC BY SUSAN SLATER SOURCE: BBN COMMUNICATIONS CONSULTING GROUP, CAMBRIDGE, MASS.

SRB bridges are invariably simple, low-cost devices that do not require any routing tables or extensive setup. SRB also permits automatic, plug-and-play interoperability between devices on different LANs. These indubitable benefits are, however, only realized at the expense of certain compromises and restrictions that may be unacceptable to some.

To begin with SRB and its routing information prefixes is an inherently fixed-path routing scheme that does not offer dynamic rerouting. If the original route fails, the end devices will again have to go through a route discovery process.

To alleviate this fixed-path limitation, most leading bridge/router vendors already offer, or intend to offer, an IP encapsulation technique that inserts SNA token-ring frames in IP packets that can be routed across the LAN internetwork. This is one of the facilities offered in the 6611 under the very misleading name of data link switching.

With this technique, routers can ensure that LAN-based SNA traffic enjoys the delights of both adaptive and dynamic alternate routing. Yet again, these benefits can only be achieved at a significant up-front cost that some may consider somewhat steep.

With IP encapsulation, routers expect network administrators to manually allocate IP addresses corresponding to the token-ring media access control addresses of LAN devices that participate in this form of routing.

This is not only an arduous task, but a regressive one, especially with configure-on-the-fly and plug-and-play networking becoming watchwords for the 1990s.

Fortunately, vendors such as CrossComm intend to provide a protocol independent routing scheme that will offer both adaptive and alternate routing without the overhead of IP address administration. But to do this, the router reverts to SRB broadcast searches to initially locate the destination.

The traffic generated by SRB explorer packets and their responses — the broadcast storms — can potentially swamp low-speed interbridge/router WAN links. These storms are now a perennial criticism of SRB. Recent independent studies, widely publicized by IBM, have essentially put this negative into perspective by indicating that virulent, damaging broadcast storms are only a threat in heavily cascaded LAN environments.

However, for networks wishing to have storm "insurance," some bridge and router vendors, such as Cisco and IBM, are now offering SRB Proxy Responder Agents. These agents provide local cache directories that learn the addresses of remote destinations when an initial search is performed and then supply that routing information for subsequent searches, thus significantly reducing the amount of inter-LAN searches.

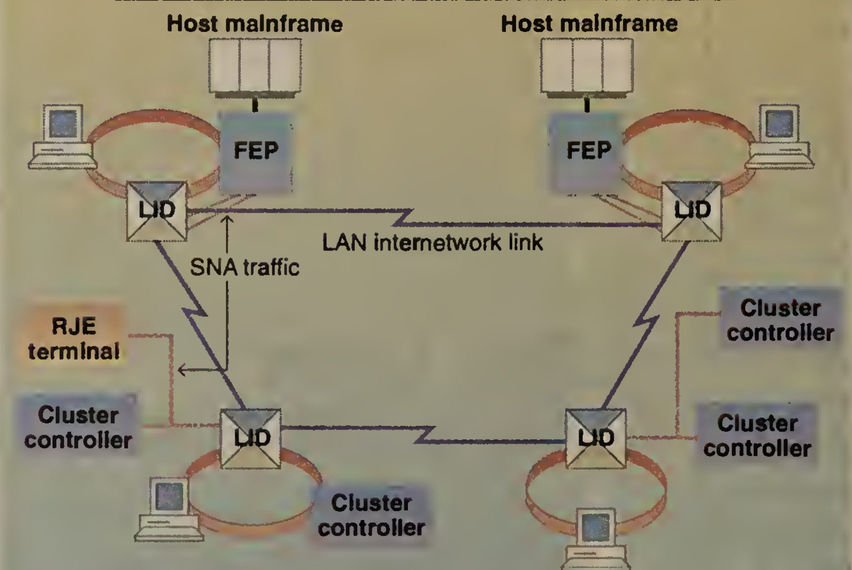
The standard token-ring architecture, because of a nonextendable Routing Information Field, imposes an invariable upper limit to the number of interconnected token-ring LANs that can be traversed by a transaction. This limit, known as the hop-count limit, is currently set at seven, with each combination of SRB bridge/router and LAN equating to one hop. Most installations do not yet find this hop count a limitation. However, it could prove to be a hindrance by cramping the flexibility of network design on expanding networks.

To alleviate this seven-hop limitation, most vendors offer an extended SRB facility that makes a bridge/router network appear as a single hop irrespective of the number of SRB bridges/routers and LANs involved. The technique is totally transparent to other standard SRB bridge/routers.

Some bridge and router vendors are also now offering support for source route transparent, which enables a bridge or router to provide interconnection simultaneously between LANs containing devices that use SRB and those using the transparent Spanning Tree Algorithm popularized in Ethernet LANs.

The holy grail of internetworking

Figure 3



FEP = Front-end processor
LID = LAN interconnection device RJE = Remote job entry

Adding true SNA routing capabilities to LAN routers will enable users to marry SNA and LAN internetwork traffic over a single LAN internet.

GRAPHIC BY SUSAN SLATER SOURCE: BBN COMMUNICATIONS CONSULTING GROUP, CAMBRIDGE, MASS.

Bringing in the links

Comprehensively integrating LAN-based SNA traffic with other LAN traffic on a multiprotocol backbone is only half the battle in eliminating the dreaded parallel backbone syndrome. To eradicate parallel backbones, bridges or routers must also be able to support directly attached SNA/SDLC and 3270 BSC devices.

The crux of the issue

Figure 1

Application	Supporting protocols
File/print services	**IBM NETBIOS,** Novell, Inc. IPX, Banyan Systems, Inc. VINES, Apple Computer, Inc. AppleTalk and Xerox Corp. XNS
Host application access	**IBM LU-to-LU Type 2 (3270 terminal to System/3X0 host) and Type 7 (5250 terminal to AS/400 host)**
Interprogram communications	**LU 6.2-based facilities, including SNA Distribution Services, Document Interchange Architecture, Distributed Data Management and SNA/File Services,** as well as **NETBIOS,** TCP/IP, Digital Equipment Corp. DECnet, IPX and XNS

IPX = Internetwork Packet Exchange

Users implement various network protocols to support different applications, but only those in bold can be sent across an SNA backbone.

GRAPHIC BY SUSAN SLATER SOURCE: BBN COMMUNICATIONS CONSULTING GROUP, CAMBRIDGE, MASS.

The good news is that most router vendors and some bridge vendors are already offering some support for SNA/SDLC links, and there is at least one vendor already working on 3270 BSC.

While Synchronous Pass-through works, there are other techniques. Last November, Cisco began shipping a Remote Polling facility for SDLC links that eliminates nonproductive poll traffic from flowing across the router backbone.

In Remote Polling, the router polls local terminals as if it were a front-end processor. A router at the host site responds to the front-end processor polls as if it were a remote terminal. When a terminal has data to send, the remote router instructs the host-site router to establish a session with the front-end processor and data flows across the router network.

IBM, in essence, just entered the internetworking market. IBM's two-port bridges were, at best, token attempts at addressing the burgeoning internetworking phenomenon. IBM's 6611 with its future APPN Network Node routing capability is its first serious foray into internetworking. Contrary to some widespread expectations, this is unlikely to be its only response.

IBM's intention to support APPN Network Node routing in host environments via VTAM and NCP within the next 18 months has now been widely publicized. IBM also intends to add 3270 data stream encapsulation to APPN within 18 months.

A golden opportunity

To accommodate these major enhancements, both VTAM and NCP will have to be significantly enhanced.

This would be a golden opportunity to upgrade NCP to run on a totally new hardware architecture, which could be a bigger version of IBM's Reduced Instruction Set Computer-based multiprotocol router.

IBM's 3745, the current flagship front-end processor, has been around longer than most of its predecessors. A much higher bandwidth engine capable of supporting multiple Switched Multimegabit Data Service, Fiber Distributed Data Interface and frame relay interfaces is somewhat overdue.

In recent interviews, some IBM officials indicated the company's cell-switching PARIS technology will be incorporated in a new communications processor that will likely run a release of NCP Version 6 that includes support for APPN Network Nodes, TCP/IP, 802.3 interfaces and frame relay.

If that hardware is a bigger version of the multiprotocol router, it should not have many problems acting as a front-end processor for the router.

And then, voila! LAN interconnection would then be accomplished across SNA/APPN backbones using SNA's tested congestion control, reliability and even IBM's NetView and SystemView management tools.

This is certainly going to be an interesting year for SNA and LANs. Neither the picture nor story will ever be the same. ◻

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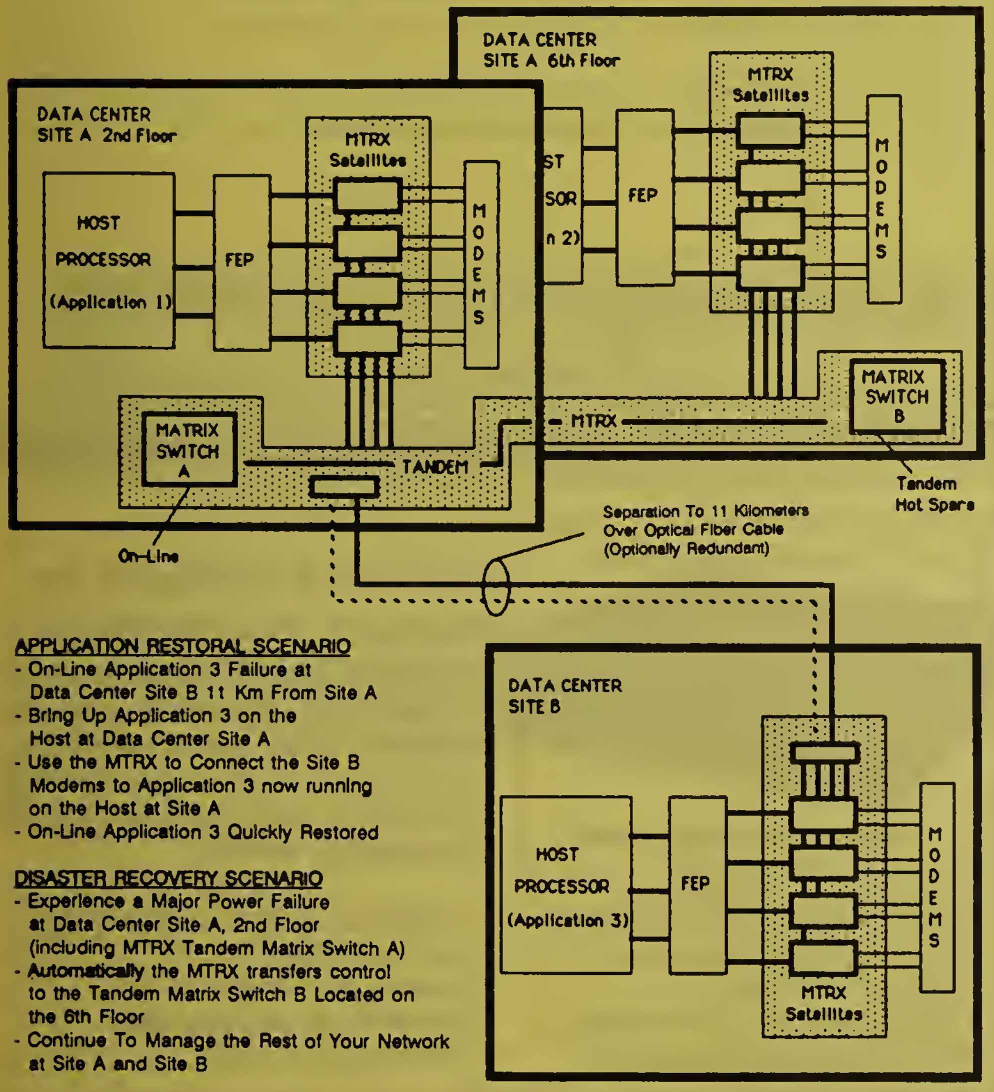

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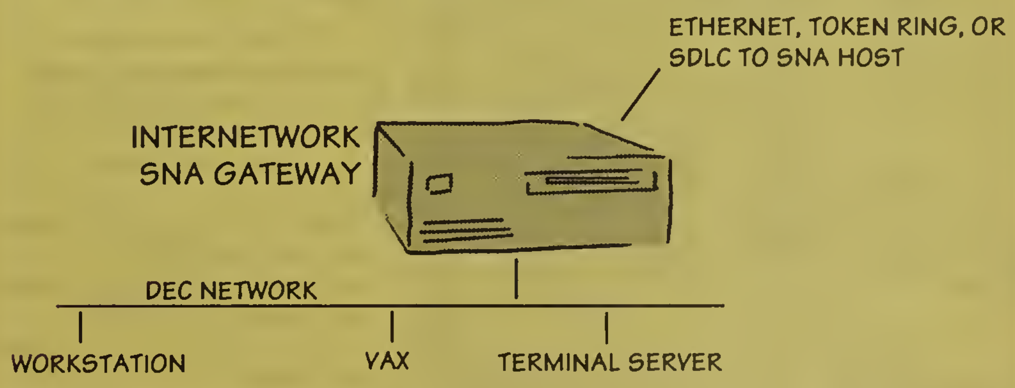

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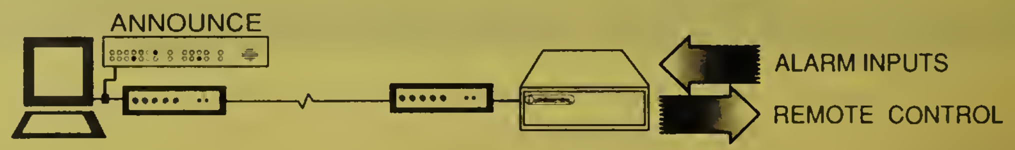

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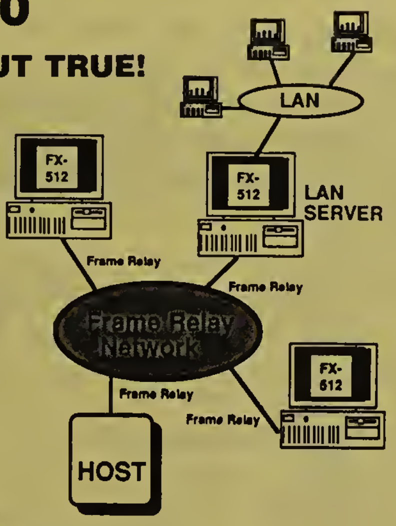

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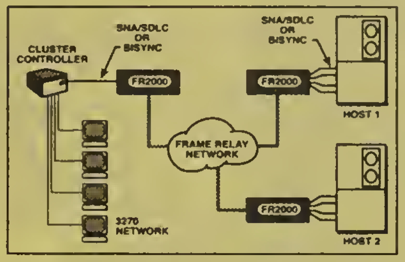

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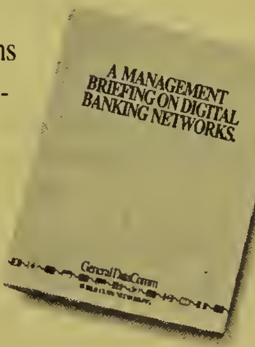

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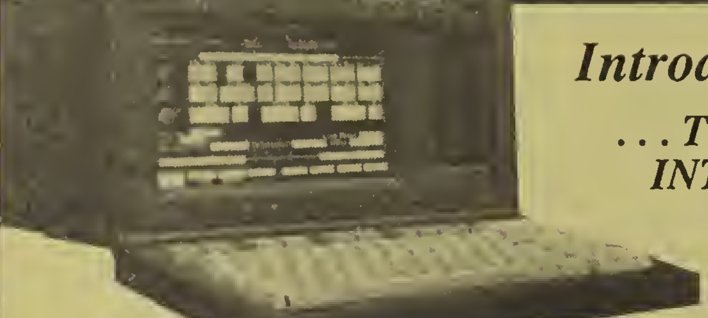

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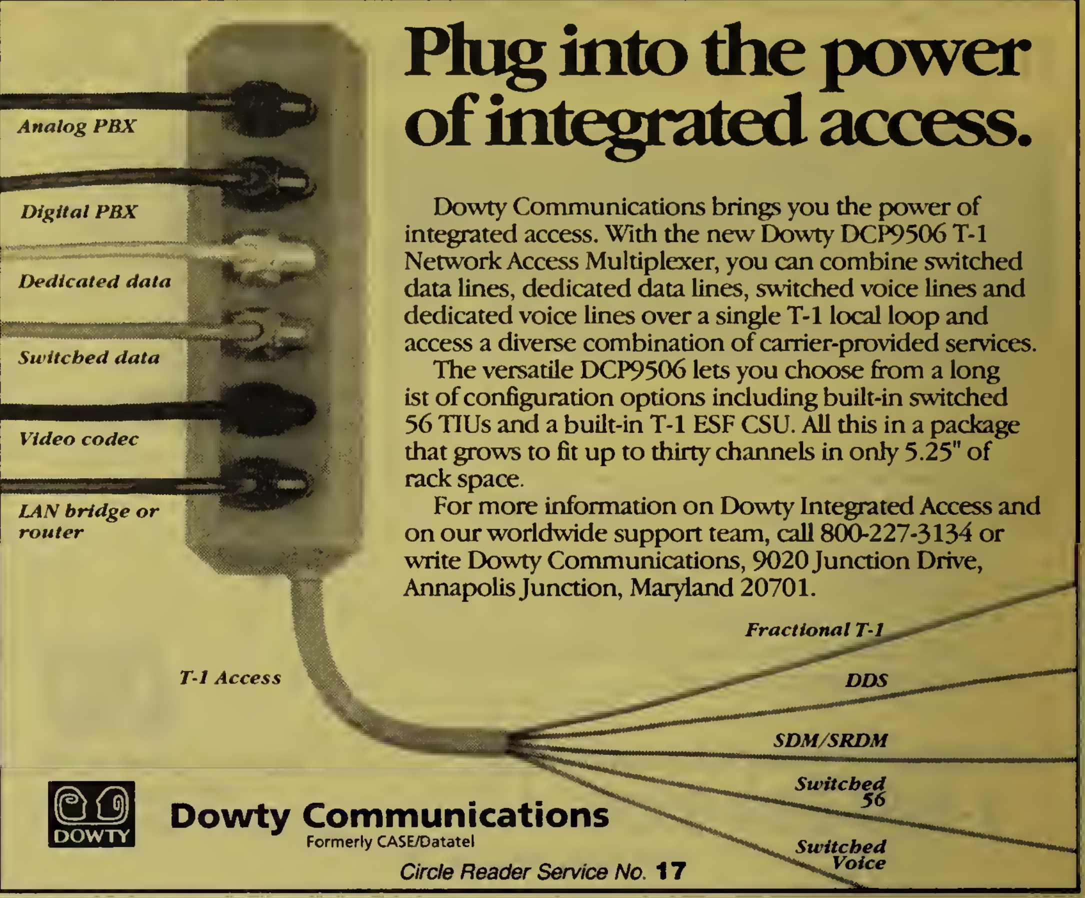
Circle Reader Service No. **19**

T-1 NETWORK ACCESS



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DOWTY **Dowty Communications**
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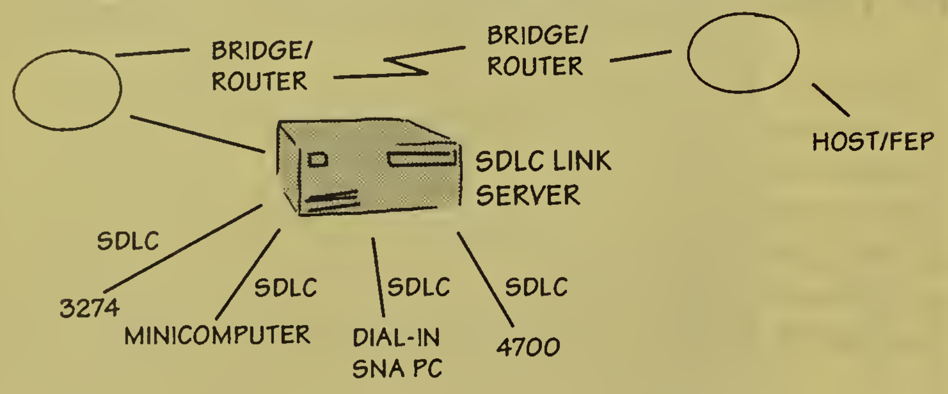

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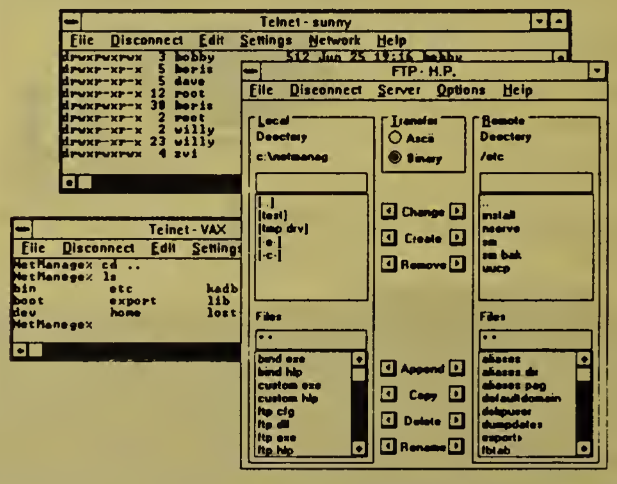
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```
drwxrwxrwx   3 bobby
drwxr-xr-x   5 boris
drwxr-xr-x   5 dave
drwxr-xr-x  12 root
drwxrwxr-x  30 boris
drwxr-xr-x   2 root
drwxr-xr-x   2 willy
drwxr-xr-x  23 willy
drwxrwxrwx   4 zvi
```

```
NetManagex cd ..
NetManagex ls
bin        etc        kadb
boot       export     lib
dev        home       lost
NetManagex
```

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Circle Reader Service No. **16**

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DATA RACE Announces Multiplexer Breakthrough

NEW Voice/Fax/Data Multiplexer saves end-users tens of thousands of dollars

By Paul Longoria

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Support a multi-vendor, multi-software scientific environment (UNIX, VMS, MAC & PC workstations) as a task leader and senior systems engineer performing advance system planning and requirements analysis; systems management in a VAX/VMS cluster/LAN/WAN environment; and systems augmentation, configuration, and optimization. Position requires a BA/BS in Computer Science, Math (or a related area), technical leadership skills, and 4-6 years experience with requirements analysis, VMS systems management, and network configuration and engineering in a VAX Cluster environment. UNIX & C experience is a plus.

PRINCIPAL SYSTEMS PROGRAMMER (NETWORK SECURITY)

Design UNIX & VMS based network security tools in support of the NASA Science Internet (NSI). Individual will also represent NSI at international conferences and workshops. Position requires an M.S. (Ph.D. preferred) in Computer Science (or a related field), 5 years experience including network security, security tool design and development, incident handling, excellent communication skills, and U.S. citizenship.

Hughes STX encourages technical excellence and achievement through the exchange of ideas, continuing education, and professional networking. We offer competitive salaries and outstanding benefits. Qualified candidates should forward their resumes with a cover letter indicating the position of interest to:

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Networking Careers On-Line :

If you're looking for more information on networking employment opportunities, consult **Networking Careers On-Line**, a part of the **Network World Bulletin Board System (BBS)**.

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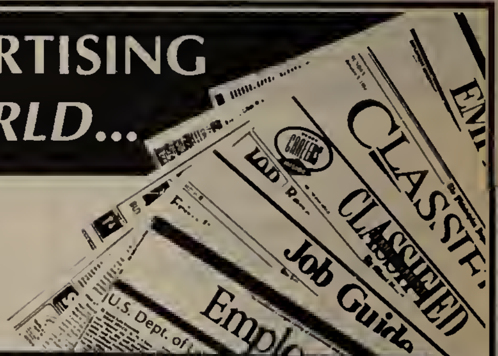

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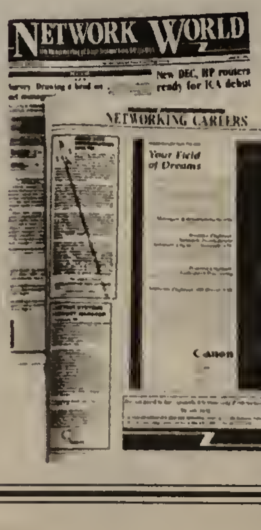

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Senior - SNMP

Maintain, enhance & develop products. Requires: 5+ years' exp., including implementing comms. networking and/or protocols-oriented product (espec. TCP/IP). Familiarity with SNMP, UNIX®, MS-DOS, C; 680x0 embedded systems exp. preferred.

Senior - Quality Assurance

Requires: 3+ years' exp. designing, writing & implementing QA test plans for communications products; knowledge of C, real-time embedded systems, XNS™, IPX®, ISO, AppleTalk®, Source Routing, Transparent Bridging, TCP/IP, & Source Routing; MAC layer bridging exp. Network administration exp. a plus.

Protocols Development

Requires: 2+ years' exp. developing protocols: DECnet™, TCP/IP, XNS, IPX, ISO, AppleTalk, Source Routing, or Transparent Bridging. Strong C, UNIX and Assembly Language skills. ICE's familiarity is a plus.

Device Drivers

Requires: 4+ years' exp. developing comms. software in embedded systems environ., including device driver develop., comms. protocols, systems services, & 680x0 Assembly Language.

HARDWARE ENGINEERING

Senior - Digital

Design, develop & enhance microprocessor-based comms. products; work with customers on joint develop. projects. Requires: BSEE & 5+ years' exp. developing microprocessor-based systems; strong hardware design skills; familiarity w/CAD systems use (Mentor/Valid); I/O & I/O interface design. Preferred: 680x0 microprocessor & comm. design; project mgmt. exp.

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Develop hardware diagnostics for new processor board/modify existing diagnostics for new hardware compatibility. Requires: BSCS or EE; 4+ years' microprocessor-based design diagnostics exp. (espec. 680x0); JTAG or equivalent technology, & C programming. UNIX exp. preferred.

CUSTOMER SUPPORT

Senior - Customer Support Network Engineers

Boston, Chicago, NY/NJ Area, San Jose

Post-sales debugging, problem duplication, beta testing, software release testing & system installation. Requires: BSCS; 3-5 years' exp.; comms. protocols knowledge (TCP/IP, DECnet, X.25); excellent debugging ability/sw knowledge. Up to 25% travel.

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Plan, develop & implement product training courses for customers/employees; develop training manuals & audio/visual aids. Requires: technical BS; 4 years' technical instructor exp.; in-depth comms. protocols knowledge—DECnet, TCP/IP, ISO. Up to 25% travel.

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WELLFLEET communications

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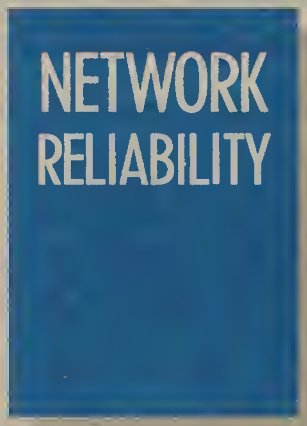

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4. Purchase influence/number of sites
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IBM licenses chipset to NSC

continued from page 4

al's Communications and Computing Group. That would give users network-ready PCs that could be easily attached to either net type.

McElroy said IBM, which dominates the token-ring market, will benefit by sharing its technology.

"This is the first time IBM has made chips generally available," he said. "By making our chips available to other token-ring vendors, we are extending our reach into the LAN market."

National will resell IBM's 16-bit Token-Ring chip, first used in IBM's Token-Ring 16/4 Adapter cards announced in November. National expects to sell about $30 million worth of the IBM chips over the next two years to makers of adapter cards, internetworking gear and other products. National will market the chip as the Token-Ring Protocol Interface Controller (TROPIC).

National has already begun offering some customers — which the company declined to name — sample copies of the TROPIC chips and expects to ship in volume in the second quarter, Carinalli said. National will provide an 802.5 certification program to its customers to help them get products to market as soon as possible, he said.

The chips will be priced at $129 in 100-piece quantities.

The licensing deal could expand the variety of token-ring products on the market, McElroy said. While IBM develops Token-Ring adapters for both Micro Channel Architecture and Industry Standard Architecture buses, it does not make adapters for Extended Industry Standard Architecture (EISA) and Digital Equipment Corp. VMEbuses. Availability of IBM chips through National could encourage other vendors to build EISA and VMEbus adapters.

Many equipment makers already support Ethernet, but are only now moving into the token-ring market, McElroy said. These vendors are prime customers for the TROPIC chip, he said.

"Now that these vendors can get our chip, end users should see more products that attach to existing token rings," he said.

Currently, most vendors rely on Texas Instruments, Inc. for token-ring chipsets. But supply shortages associated with the TI chipsets in the past will make an alternate chip source a welcome addition, according to observers.

"National's entry is great for the overall market," said a spokeswoman for Proteon, Inc., a major player in the token-ring market. "We'll seriously look into the new chipset."

Brad Baldwin, an analyst at Gartner Group, Inc., a Stamford, Conn., market research firm, said wider availability of products based on an IBM-made chip will benefit users — particularly those concerned with interoperability of token-ring products. ☐

New tool eases net management

continued from page 5

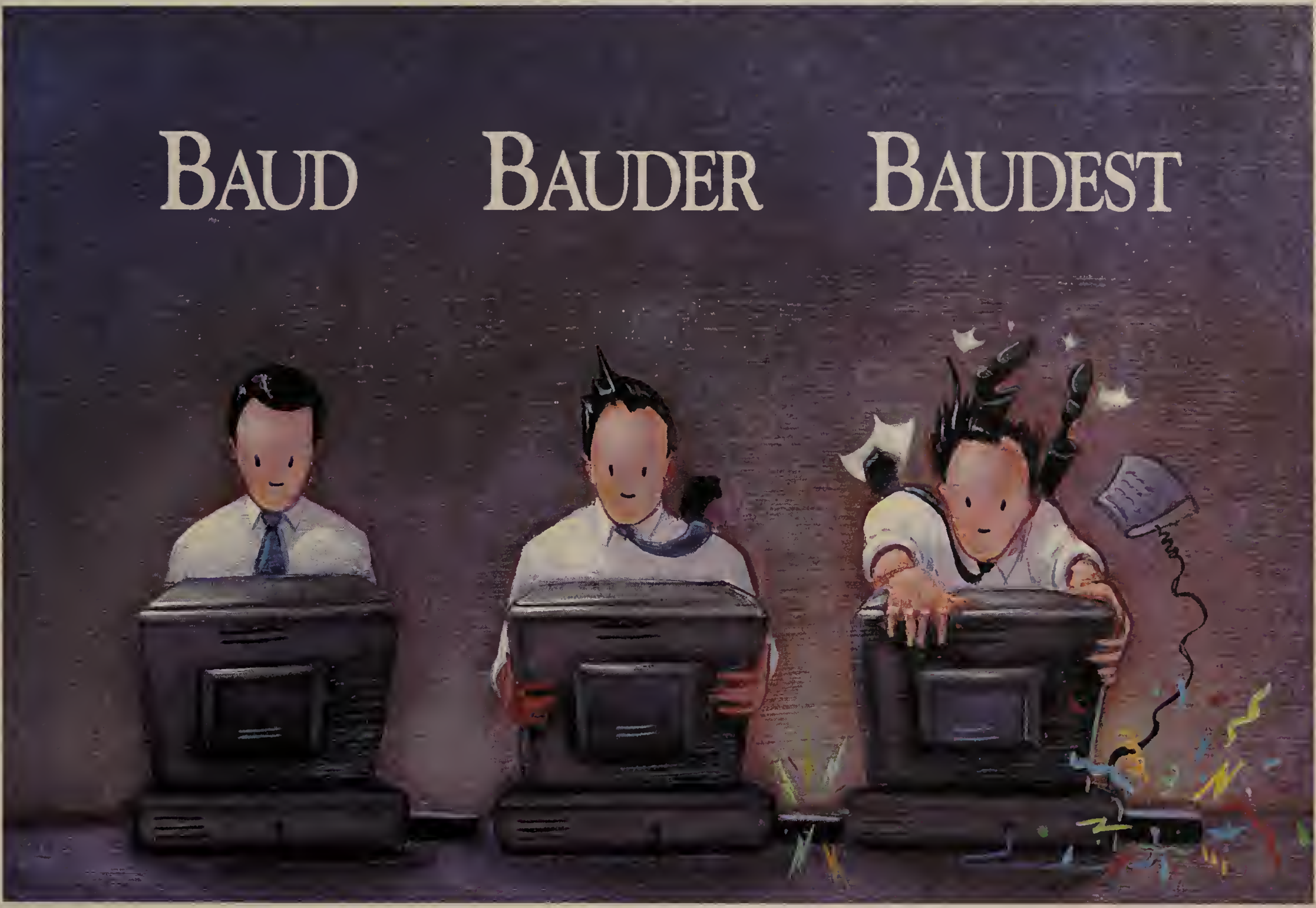
problems on the token ring, it lets us look at network performance end-to-end, and it also gives us information for capacity planning," he said.

Before using LANSpy, Berliner had trouble diagnosing LAN problems. "Essentially, it was trial and error before," he said. "With this product, we can see utilization statistics that help us pinpoint the problem."

In the future, LANSpy will support Ethernets. Legent also plans to support Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Transmission Control Protocol/Internet Protocol.

The company said it is working with router and bridge vendors to enable LANSpy to collect performance statistics from those vendors' devices.

LANSpy is available now and is priced at $36,300 for a package supporting a 1,000-workstation LAN and including a LANSpy mainframe-based component. A modified version of NetSpy for users that already have an SNA performance product costs $4,000. NetSpy regularly costs $34,000 for IBM's 3090 Model 280 mainframe. ☐



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DEC to improve integration

continued from page 4

Dick Crane, director of communications at Massachusetts General Hospital here said his facility uses both types of equipment. "It would be nice if there were some kind of common ground," he added.

A DEC spokeswoman confirmed that the company will deliver a statement of direction for Pathworks this week but declined to comment further.

It is still unclear how DEC will implement NetWare services on Pathworks servers. But analysts and developers said DEC may incorporate Novell's Internetwork Packet Exchange (IPX) protocol stack as another transport mechanism in Pathworks, in addition to the Transmission Control Protocol/Internet Protocol and DECnet protocols Pathworks already supports. They also believe DEC will support Novell's NetWare Core Protocol (NCP) file service protocol as a method for sharing files between DOS clients and VAX/Ultrix servers.

Novell currently offers interoperability with DEC systems via its NetWare for VMS offering, while DEC offers its Pathworks for DOS Version 4.1 with a NetWare Coexistence option. Interconnections, Inc. in Bellevue, Wash., developed NetWare for VMS and teamed with DEC to develop NetWare Coexistence.

DEC's new Pathworks products are expected to differ from those offerings by including native support for IPX and NCP protocols, as well as DECnet and TCP/IP, analysts said.

NetWare for VMS also supports native IPX but not DECnet. NetWare for VMS uses IPX to access applications and support terminal emulation. In the new Pathworks product, IPX is expected to be used only for NetWare file and print services, while DECnet will handle application access and terminal-emulation services.

Also, NetWare for VMS supports NetWare Version 2.1, allowing VMS systems to appear to LAN clients as a NetWare Version 2.1 file server, whereas the new Pathworks products are expected to support NetWare 3.11.

NetWare Coexistence allows NetWare clients on an Ethernet LAN to access Pathworks and NetWare servers concurrently. Unlike the new Pathworks products, NetWare Coexistence communicates with separate NetWare and Pathworks servers. Also, it uses a lot of additional client memory, critics said.

DEC this week is also expected to unveil Version 1.1 of NetWare Coexistence, which supports token-ring LANs.

Eastman Kodak uses NetWare for VMS to allow its NetWare clients to access data and applications on VAX systems, but company personnel are dissatisfied with it, Parsons said.

Pathworks' future

Observers believe that the new Pathworks products will go a long way toward furthering DEC's directive as a provider of open multivendor networks.

"Pathworks is too proprietary right now to be accepted by several users," said Charles Robbins, director of communications research at Aberdeen Group, Inc. in Boston. He added that DEC has to tightly integrate it with NetWare in order to increase its market appeal.

Steve Papermaster, president of Business Systems Group, Inc., a Houston systems integrator, said, "The further isolated they are [from NetWare], the less chance they have of Pathworks succeeding."

Users like Eastman Kodak, however, who are looking to standardize on NetWare for the corporate LAN environment, may be disappointed that they have to purchase Pathworks in order to integrate DEC systems into NetWare LANs.

"Frankly, I was really hoping Novell would come out with a successor to NetWare for VMS that's IPX-based," Eastman Kodak's Parsons said. "[I'd like to see] the VAX as another server that they support. But something is better than nothing."

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Standards mix leaves telcos vulnerable

continued from page 2

and public safety," said Rep. Edward Markey (D-Mass.), chairman of the subcommittee. "The consequence to safety and the economy are too great to [rely on] a regulatory system that allows each company to grade itself."

Congress began investigating network reliability last year after eight major outages left millions of customers without local and long-distance service for hours at a time. Spurred on by users who complained that the Federal Communications Commission is doing little to prevent network disruptions, Congress pressed carriers to submit information on their standards.

In a letter to lawmakers last week regarding the report, attorneys for the Tele-Communications Association, Inc. (TCA) characterized the FCC's approach to network reliability as "wholly inadequate" and added that, without congressional prompting, the agency is unlikely to increase its oversight.

"The FCC had done nothing to understand what criteria the industry uses to measure performance or to develop a means of monitoring improvement or deterioration in the network over time," TCA officials said.

The subcommittee report marks the first time a comprehensive listing of inter-

(continued on page 76)

Users hail debut of mgmt. system

continued from page 1

act on it; and the NetWare Management Map, software that gives the administrator a graphical depiction of the information.

The agents

Novell's NetWare Management Agent is a single software product that consists of three NetWare Loadable Modules (NLM).

The agent, which has to be loaded in each NetWare server to be managed using NMS, provides two primary services.

First, it collects statistics from the server — including random-access memory usage and available disk space — and data from attached devices, such as client workstations and hubs. Second, the agent is responsible for alarm notification, alerting the administrator in real time of potential resource allocation or attribute problems.

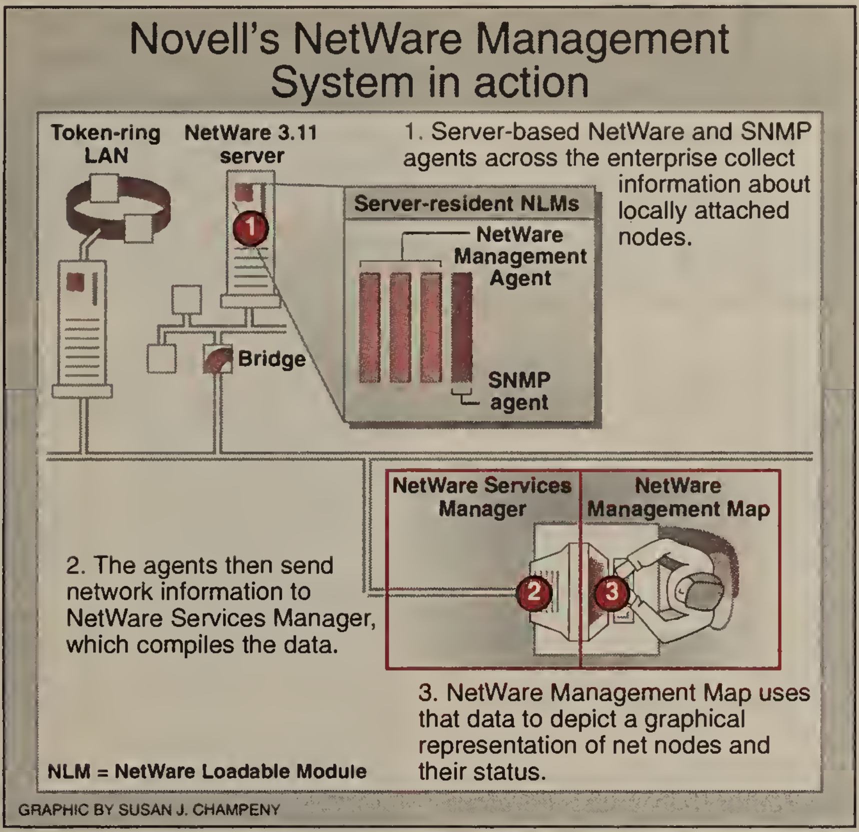
Novell also announced a series of software development kits for third parties that will make it possible to develop products that can "register" with the Novell agent (see "NMS wins industry following," this page). Once registered, the agent will know to collect information from these products, although they are not NetWare-specific.

For more standardized management, Novell will also supply a Simple Network Management Protocol agent as an NLM to run on the local server. This agent will be able to collect information about SNMP-based devices on the NetWare LAN using the MIB II management information base.

The services manager

The agents are polled by the NetWare Services Manager using Novell's Internetwork Packet Exchange (IPX) or Transmission Control Protocol/Internet Protocol. The NetWare Services Manager is a management console application that runs on either a dedicated or nondedicated personal computer over Microsoft Corp. Windows or IBM OS/2 Presentation Manager.

The NetWare Services Manager, which is based on a Novell Btrieve database, compiles and organizes the information gathered from the agents and lets the administrator centrally monitor and control all NetWare nodes. For example, through NetWare Services Manager, administrators will be able to conduct point-to-point packet transmit/receive tests to isolate communication faults, and through the central console, they will be able to enable and disable faulty ports.



Novell's NetWare Management System in action

Token-ring LAN
NetWare 3.11 server
1. Server-based NetWare and SNMP agents across the enterprise collect information about locally attached nodes.
Server-resident NLMs
NetWare Management Agent
SNMP agent
Bridge
1
2. The agents then send network information to NetWare Services Manager, which compiles the data.
NetWare Services Manager
NetWare Management Map
2
3
3. NetWare Management Map uses that data to depict a graphical representation of net nodes and their status.
NLM = NetWare Loadable Module

GRAPHIC BY SUSAN J. CHAMPENY

NetWare Services Manager also lets administrators set thresholds for various network parameters such as the number of open files on a given server. In addition, the application automatically generates predefined reports from the database that make it possible to compare network status with network requirements.

Novell said agents will also be able to respond to polls from other systems, including IBM's NetView net management product and other future management systems.

The management map

Data compiled by NetWare Services Manager is displayed using the NetWare Management Map, which comes with the services manager software. The map software automatically discovers NetWare-based servers, cable segments, routers and workstations within the enterprise and gives a graphical representation of the entire network.

Then, as necessary, the administrator can home in on certain LAN segments and remote nodes to get configuration information or to launch third-party applications — residing within the NetWare Services Manager workstation — to perform more detailed analysis or testing.

Janet Hyland, director of Network Strategy Research at Forrester Research, Inc. in Cambridge, Mass., said, "Novell started out with the idea of managing NetWare networks, but they've gone beyond that to manage much more of the network, such as the hubs, server hardware, adapter cards and more."

Users were a bit more skeptical.

"I don't think any one product on the market today or at any time in the future will satisfy all network management needs," said Sara Lee's Bandrowski. "There are just too many types of technology out there that need to be managed. But Novell's solution is inherently better than other approaches."

Other users contend that the product's ultimate success will depend on third-party support.

"If Novell has the clout to get other vendors to cooperate, that's great," said Robert Green, manager of network operations at HealthCare Compare/Affordable, a Novell user based in Downers Grove, Ill. "But we have a multivendor environment, and if all the players don't play, it will defeat the whole purpose [of NMS]."

The NetWare Services Manager will be available in April for $4,995 and will include one NetWare Management Agent and the NetWare Management Map. The NetWare Management Agent will be available separately in April for $495 per server, or in packages of 20 for $7,995, 100 for $34,995 or 500 for $150,000. The NetWare Management Enhanced Map will be available in July and is priced at $1,995.

NMS wins industry following

More than 50 vendors from various computer and network industry segments last week pledged support for Novell, Inc.'s NetWare Management System (NMS).

Cabletron Systems, Inc., Compaq Computer Corp., Hewlett-Packard Co. and SynOptics Communications, Inc. were among the dozens pledging to base new products on NMS or enhance existing offerings to feed data to the Novell local-area network management system.

"Novell is suffering from prom-queen syndrome," said Janet Hyland, director of Network Strategy Research at Forrester Research, Inc., a market research firm based in Cambridge, Mass. "Everyone wants to dance with the prom queen."

Some companies have even announced specific plans for linking their products with NMS. 3Com Corp., for instance, said it plans to support NMS in its line of Ethernet adapters and its LinkBuilder 10BTi intelligent hubs.

Dolphin Networks plans to roll out a Microsoft Corp. Windows-based artifical intelligent diagnostic program by the third quarter of this year. The product will use data gathered by NMS to help administrators diagnose problems.

"NMS will provide end users with the capability to unify various third-party management tools while allowing the administrator to manage the enterprise via a consistent user interface," said ReiJane Huai, vice-president of engineering at Cheyenne Software, Inc. in Roslyn, N.Y.

These third parties will be able to incorporate their products into the NMS architecture by using the NMS software development kits (SDK). Novell will make these kits available in April at a cost of $4,995. They will contain a set of application program interfaces that will specify how to link products to the NMS interface.

Novell also announced immediate availabilty of its NetWare Management Toolkit, which costs $4,995. This will let NetWare Loadable Module developers design their products to work within the NMS using either the Simple Network Management Protocol or Novell's NetWare Management Agent.

— *Caryn Gillooly*

API allows mix of transports

continued from page 2

processes on the network.

"If we don't establish a single interface, developers face a daunting task in writing applications that need interfaces to all the messaging systems out there," said Terry Rogers, vice-president and general manager of the Communications Products Division at Lotus.

Although the VIM specification is expected to be available for all interested developers next month, no further technical details were available at press time. The specification is expected to be outlined by the VIM Interface steering group prior to its release.

Despite the public show of cooperation, some sources close to the firms involved said the real motivation behind the new agreement was political, not technical. When it was first proposed by Lotus last October, the OMI specification was criticized by analysts because it lacked a clearly defined way for vendors to map specific net functions.

By contrast, Microsoft Corp.'s Messaging Application Programming Interface (MAPI) was viewed as more viable because of its Service Provider Interface, its tight integration with Windows and its implementation of object-oriented semantics.

Although the VIM effort could be viewed as just another response to Microsoft's increasing efforts to set desktop standards around its Windows strategy, Gursharan Sidhu, VIM Interface steering group chairman and Apple's technical director, said the group would actually welcome Microsoft's input.

"We'd be happy to have Microsoft participate in a future release," he said. "But Microsoft's MAPI is just one more vendor-specific proprietary design."

Dwayne Walker, director of marketing and business development at Microsoft, rebuked this assertion and said MAPI's tight integration with Windows does not make it proprietary. "Microsoft has been soliciting input from the industry all along in an attempt to create an open messaging interface," he said. "We will continue along these lines."

All the companies participating in the agreement pledged their support for VIM, although Novell made separate moves this week to hedge its bets. In a confidential, three-page memo sent to its developers last week, Novell said it agreed to support VIM in future versions of its messaging engine — the NetWare Message Handling Service (MHS) — but would still prefer that developers write directly to MHS' application interface.

Some analysts contend that the VIM effort is most likely the result of Lotus making concessions to other vendors such as Novell in order to gain allies in its battle with Microsoft.

As a result, sources say Lotus is being pressured to remove aspects of OMI that would have made Novell's MHS appear to developers as a weaker messaging alternative.

If this occurs, analysts predict that Lotus would need to offer extensions to VIM that could provide the additional functionality that would have been available in the original OMI specification.

Analysts contend that these types of mixed signals further muddy the waters. "VIM does not solve the problem of providing a single messaging interface for developers," said Jamie Lewis, principal analyst with The Burton Group, a networking consulting firm based in Salt Lake City. "Nothing has changed because now developers will need to support VIM, MAPI and MHS."

Backbone gives best of worlds

continued from page 1

Paul Dover, staff manager of communications at United Telephone, said construction of the T-3 net was driven by a dramatic increase in LAN traffic.

"Our local-area networks are exploding," he said. "We seem to contribute to the growth by removing the choke from the wide-area network."

United Telephone currently has 30 to 35 Ethernet segments and about 10 token-ring LANs at some 20 sites in Florida. The LANs support Banyan Systems, Inc. VINES, the Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems, as well as Digital Equipment Corp.'s DECnet and Local Area Transport protocols.

Routers at each remote site feed LAN traffic via leased lines to Cisco Systems, Inc. AGS+ bridge/routers at five regional locations (see graphic, page 1). Bridge/routers concentrate traffic onto 6.318M bit/sec channels via V.35 connections to T3plus Networking, Inc. BMX45A T-3 multiplexers at the regional sites.

In the case of a link failure, the T-3 muxes will find a new route in four seconds or less.

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"That's as fast as you can run V.35," Dover said, adding that the company plans to install High Speed Serial Interfaces (HSSI) on its routers and muxes this year. HSSI supports speeds up to about 50M bit/sec and will facilitate such applications as backing up Banyan servers.

"Currently, with a 6M link, that takes us about 5½ to 6½ hours," Dover said.

United Telephone is now prepping its LAN internet for SNA. In the next few weeks, IBM 3745 Model 150 front-end processors will be installed at four regional locations. Each will be attached to two token rings supporting connections to local cluster controllers and a router.

Remote cluster controllers will be linked to the new front ends via serial lines using the Synchronous Data Link Control protocol. The 3745s will convert the SDLC packets to token-ring format so they can ride over the router-based backbone, as well.

The Cisco routers will encapsulate SNA data in High-Level Data Link Control packets for transport across the multiprotocol backbone, Dover said. That should provide better throughput than using the more common IP encapsulation because HDLC is a simpler protocol, he said.

In the case of a link failure, the T-3 muxes will find a new route in four seconds or less. And the remote front ends will be configured to keep SNA sessions active for at least that long.

Longer term, United Telephone is eyeing recently announced features that enable Cisco routers to provide local acknowledgments to cluster controllers, just as the remote front-end processors do. That could extend front end-type benefits to smaller sites where the cost of a front end cannot be justified.

The four regional front ends will provide improved response time because controllers can be polled by the regional front ends — which will often be attached to each other via a LAN — rather than by the central front-end processor here. It will also reduce bandwidth requirements by concentrating SDLC links onto large channels handling multiple protocols and by removing polling data from the backbone.

Right now, United Telephone runs 56K bit/sec SDLC links from cluster controllers at large sites to central front-end processors. Those links operate between 50% and 70% utilization, which is considered high for SDLC links.

But Dover estimates the multiprotocol backbone will consistently be 80% utilitized because multiple token rings can be employed to provide load balancing.

A number of other network enhancements are on tap at United Telephone. The company plans to migrate the element management systems it uses to manage its routers, SynOptics Communications, Inc. hubs and T-3 equipment to a single Simple Network Management Protocol-based platform. But that is not likely to happen until the company migrates to the RubSystem, which it will probably do later this year.

The four new regional front ends will provide improved response time.

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The RubSystem is a combination router/hub under development by Cisco, SynOptics and SunConnect which can be managed via the SunConnect SunNet Manager-based SNMP management system.

The firm is also planning to install T3plus' recently announced BMX45N mux, which will replace two BMX45As here. The new multiplexer will integrate two separate T-3 rings that are connected only via multiple T-1s. The larger capacity BMX45N will support T-3 links between the rings, thus improving the rerouting capabilities of the mux, which is a critical factor in T-3 nets (see "Bear, Stearns net delivers in crisis," this page).

Bear, Stearns net delivers in crisis

NEW YORK — The ability to automatically route around network failures becomes even more important when your network consists of massive T-3 pipes.

With that in mind, the financial services firm Bear, Stearns & Company, Inc. built a meshed T-3 net using Adaptive Corp. SONET Transmission Manager Model 18 (STM/18) switches, which boast the ability to quickly route around failures ("Bear, Stearns bullish on Adaptive's STM/18 switch," *NW*, Aug. 5, 1991). Recently, the Adaptive gear had to live up to that billing.

On Friday, Jan. 31, at about 3:30 p.m., a technician conducting maintenance in a New Jersey Bell Telephone Co. central office inadvertently took two Bear, Stearns T-3s out of service, said Jeff Marshall, managing director of communications for the brokerage and investment firm here.

Withstanding the test

"The Adaptive [switches] rerouted around the whole nightmare," Marshall said. "It was imperceptible."

The T-3 failure lasted between 10 and 20 minutes, he said, and occurred near the end of the day on the last day of the month — a period of heavy transaction volume on Wall Street.

Marshall declined to put a dollar value on his company's potential losses had the network not been able to recover.

"It can be rather painful when you have large chunks of bandwidth leaving your network unannounced," he said. "When your user organization does not feel that loss, then you're probably doing a good job."

Bear, Stearns currently has eight STM/18s supporting a meshed T-3 net that serves multiple trading floors and data centers in New York and New Jersey. More T-3s and STM/18s are on tap for the near future.

— *Paul Desmond*

Mix leaves telcos vulnerable

continued from page 74

nal net quality standards has been made public. Users have loudly complained that telephone companies often balk at, or refuse entirely, to provide such information to users. Markey and fellow committee member Rep. John Bryant (D-Texas) indicated they will turn up the pressure on the FCC to step in and set national network quality standards.

In hearings last year before Markey's subcommittee and the Subcommittee on Government Information, Justice and Agriculture, FCC Common Carrier Bureau Chief Richard Firestone said he opposed national standards.

Varying standards for T-1 service

Carrier	Bit error rate	Availability	Error-free seconds
Ameritech	Undisclosed	99.975% over 12 months	98.75% over 24 hours; 99.975% over 12 months
Bell Atlantic Corp.	No standard	99.925% over 12 consecutive months	98.75%
BellSouth Corp.	No standard	No standard	95.00% over 24 hours
GTE Telephone Co.	$1X10^{-9}$	99.925%	No standard
Nevada Bell	$1X10^{-9}$	99.925%	98.75%
Nynex Corp.	No standard	99.70% intra-LATA; 99.925% inter-LATA	95.00% over 24 hours for Superpath; 98.75% interstate
Pacific Bell	$1X10^{-9}$	99.975%	99.85%
Southwestern Bell Corp.	No standard	99.975% over 3 months	99.75% over 24 hours (98.75% for some locations)
United Telecommunications, Inc.	$1X10^{-7}$	99.925%	No standard
U.S. West, Inc.	$1X10^{-6}$ copper; $1X10^{-9}$ fiber	99.70%; 99.985% self-healing	98.75%

GRAPHIC BY SUSAN SLATER SOURCE: HOUSE SUBCOMMITTEE ON TELECOMMUNICATIONS AND FINANCE

"I don't feel that having the government set standards at this time is best," Firestone told the subcommittee, which is chaired by Rep. Bob Wise (D-W.Va.). "Standards tend to settle to the lowest common denominator."

But users disagree. "The FCC has not been responsive to users' service quality concerns," said Brian Moir, counsel for the International Communications Association. He said congressional efforts to make information on carrier standards available will benefit users.

Sen. Larry Pressler (R-S.D.) introduced a bill late last month to set up an independent agency within the FCC to conduct investigations of network outages and establish reliability recommendations. Pressler said the proposed National Network Security Board is needed because "we now have absolutely no mechanism for investigating network crashes and making recommendations to prevent future outages."

The subcommittee report last week added to such concerns because it showed wide differences in network standards and revealed that some carriers have no standards at all in certain areas.

For example, the report found disparities in acceptable trouble levels among carriers. Wisconsin Bell, Inc. aims for 1.6 trouble reports per 100 lines, while GTE Telephone companies ranged from five to seven reports per 100 lines with a high of 10 reports in Indiana.

Carriers also varied widely in their standards for installation and repair of various service types. Bell Atlantic Corp. has the shortest installation goal for T-1 lines, promising service in no more than seven days if the necessary equipment is in place. Southwestern Bell Corp.'s standard for installation of T-1 lines is eight to 10 days if the equipment is available.

Pacific Bell has the longest installation standard for T-1 lines of 19 days. New York Telephone Co., New England Telephone and Telegraph Co. and Nevada Bell have no standards.

"The FCC has not been responsive to users' service quality concerns."

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Also, carriers varied on their standards for repair of T-1 lines. United Telecom had the shortest repair standard at one hour in some states it serves, while The Ohio Bell Telephone Co. and Indiana Bell Telephone Co. have a standard of two hours.

AT&T intros long-haul pack

continued from page 4

access site, which is waived at $50; and a $50 charge for each dedicated access site, which is waived at $500.

AT&T Optimum volume discounts

Figure 1

Usage per month	Discount
$7,500 - $10,000	4%
$10,000 - $15,000	7%
$15,000 - $30,000	10%
Over $30,000	15%

SOURCE: AT&T, BASKING RIDGE, N.J.
GRAPHIC BY SUSAN J. CHAMPENEY

Optimum offers a volume discount and term plan structure (see Figures 1 and 2, this page).

AT&T built a dedicated center to provision and monitor the service's performance. Optimum can be provisioned to switched and dedicated access sites in five days or less and to sites that previously used Megacom in 15 days, according to Les Nicholson, Optimum's product manager.

Users that do not specify a provisioning interval will receive the service in 30 days. If AT&T fails to provide Optimum within its provisioning intervals, it will pay for the service's onetime installation charge.

The carrier is also offering rebates to users that experience service outages exceeding six hours, unless the problem was caused by customer premises equipment.

The technicians are equipped with systems using the extended superframe format to monitor performance of customers' T-1 access links, Nicholson added.

AT&T will provide customers with quarterly reports chronicling service performance and maintenance and will list new sites as well as those no longer using the service. To simplify cost accounting, AT&T will offer Optimum customers a single invoice and reporting package that details calls and charges for domestic and international outbound and credit card calls.

The Optimum Detail Manager software package runs on most microcomputers and carries a onetime $150 charge.

Optimum is scheduled for availability this week. ☐

AT&T Optimum term plan structure

Figure 2

Monthly commitment	Guaranteed monthly minimum	Term discount percentage		
		18 months	36 months	48 months
$5,000	$3,750	2.0	3.5	5.0
10,000	7,500	2.5	4.25	6.0
15,000	11,250	3.0	5.0	7.0
20,000	15,000	4.0	6.0	8.0

GRAPHIC BY SUSAN J. CHAMPENEY
SOURCE: AT&T, BASKING RIDGE, N.J.

Letters

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ring lengths and token rotation time. And other forms of errors, especially in 10Base-T environments, collectively degrade performance faster when more stations are involved.

Your target audience is organizations with the largest networks because these are of utmost interest to your advertisers. Every week, you have valuable and timely articles that are aimed squarely at that group.

As you know, large corporations with multisite local- and wide-area networks long ago stopped evaluating products based on how well they functioned in a department. The realities of routing protocols and wide-area access to resources anywhere on a network have mandated that such products prove themselves on the entire network, not just some small portion of it. This article dealt only with LANs and, therefore, doesn't apply to most of your readership.

The Network Strategies Group has been in the end-user performance analysis business for three years and has built a reputation for accuracy, integrity and thoroughness. We love *Network World*. But we do work every day for the same kinds of companies you target, and this time, we think you didn't do a fair job for those readers.

Charles Lukaszewski
President
The Network Strategies Group
Minneapolis

Enterprise Technology Center, Inc. response: The article does not purport to be an exhaustive test of all capabilities and features of network operating systems. It examined performance of unoptimized network operating systems under conditions designed to illustrate certain application environments.

We agree that many other factors are extremely important in the evaluation of a network operating system. In fact, the first sentence of the article states that "performance is only one of many factors to consider when choosing a local-area network operating system." And the testing focused on the network speed of file-sharing operations, which Mr. Lukaszewski suggests is the "primary reason to buy a network operating system."

We also agree it is difficult to simulate the real-world performance of a network. That's why we describe exactly how the test was conducted so readers may judge the environment for themselves.

The intent of the test was not to express exact transfer rates associated with each network operating system. Rather, its purpose was to show general trends and the relative performance of one network operating system to the others. That would give readers an indication of how different application sets and work group sizes affected each system.

It is true that when using 100 actual nodes, the network would experience more Ethernet collisions than when using only five nodes. However, during the test, we monitored the Ethernet collisions and did not include graphs where collisions had obviously affected performance. Specifically, we measured the number of collisions and adjusted that figure to reflect the target number of nodes. If the resulting number of collisions was greater than 10% of the total packets transferred, the charts were not included in the article.

During the test, we noticed that each network operating system experienced approximately the same percentage of collisions (after accounting for time). In other words, each operating system had to deal with roughly the same problem.

Therefore, while the way we constructed the test affected the actual results, it did not cause a significant difference in those relative results. Showing relative performance and trends was very much in line with the intent of the test, as was described in the first few paragraphs of the article.

While the test was conducted on Ethernet only, the article explains how that affected the results and the differences between Ethernet, token ring and Fiber Distributed Data Interface in this regard.

In addition, the article neither stated nor implied that we have a preference for one network operating system over another. We agree that each is good for different applications and implementations.

And while the article deals only with LANs, it is well suited to the needs of readers trying to determine the appropriate platforms for applications as part of an enterprise network strategy. ☐

Deal exceeds expectations

continued from page 2

Network Architecture, he added.

With IBM by its side, Novell increased its dominant share of the local-area network operating system market last year by a few percentage points to about 60%, analysts said.

Novell attributed about $8 million — or 5% of its quarterly revenue — to sales of NetWare through IBM, which is consistent with Novell's goal, said Darrell Miller, executive vice-president of Novell.

The most significant aspect of the IBM sales pact is that the majority of IBM's NetWare accounts are with MIS departments, an area where Novell traditionally has been weak, Miller said.

"We've never been in that corporate IS segment. Today, I spend most of my time talking to those groups," he said. "The major new products we are rolling out now, such as support for naming directories, are targeted for these customers."

Novell is also on track with the development of NetWare Version 3.2, which is slated for rollout by year end. Miller said NetWare 3.2 will come in several versions, including support for IBM's OS/2 and AIX operating systems.

The major benefit for IBM is that it has been able to offer its customers a choice of network operating system products by selling NetWare and its own OS/2-based LAN Server, said Art Olbert, personal systems director of LAN systems at IBM in Austin, Texas.

"The basic premise [behind the Novell deal] was that we would provide a [network operating system] choice. For those people who have already chosen NetWare, they can get the IBM service and support with the NetWare products [customers] have and are installing," he said.

One lingering concern among industry observers is the clarity of IBM's LAN direction.

Mike Safar, director of software development at PC DOCS, Inc., a Tallahassee, Fla., document management software maker for NetWare networks, said his doubts about IBM's long-term commitment to LAN Server are making it difficult to decide whether his company should devote the resources to train its employees on how to support LAN Server.

"IBM is as confused about LAN Server as the rest of us are," Safar said.

However, Olbert refuted that notion. He said IBM believes NetWare and LAN Server meet two different sets of customer needs. IBM is positioning LAN Server as the solution for users seeking distributed computing capabilities and the integration of a LAN server with IBM hosts and wide-area network offerings, Olbert said.

"There is no intention on Novell's part to integrate NetWare with the IBM host systems by using the same directory, security and transaction processing mechanisms," he said.

According to Olbert, IBM is pitching both LAN Server and NetWare to those customers interested in resource sharing between clients and servers. This is where NetWare has the edge, given the many NetWare applications available, he said.

As evidence that IBM is still behind LAN Server, Olbert pointed to IBM's October announcement of LAN Server 2.0, which will be available in the third quarter. IBM has also pledged to support Apple Computer, Inc. Macintoshes on LAN Server, he said.

"We've taken some very public steps to show that we are fully committed to LAN Server," Olbert said.

Lee Doyle, an analyst at International Data Corp., a Framingham, Mass., market research firm, said IBM's LAN strategy has become clearer. "IBM still has to do a little song and dance to explain when to buy LAN Server or NetWare, but a lot of users have had time to make up their minds on what they want to use," Doyle said. "They're just happy to see the two companies working together." ☐

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NCSA casts light on scanners

continued from page 1

NETWORK SECURITY TEST SERIES

tion of the most useful products and uncovered important differences concerning product features and performance.

For most of the products tested, scanning is simply one of many functions supported. For instance, some devices come with virus removal capabilities or offer a cyclic redundancy check feature, which helps users know when files have been infected.

Virus removal tools were the subject of an earlier test series article ("Good virus protection comes cheap, test shows," *NW*, Oct. 21, 1991). Future tests will examine other features of these products.

While scanners are only a component of most anti-virus tools, they can be the most critical element, said David Stang, research director for the NCSA.

In the scanner test, the association devised a rating scheme that awarded points for identifying infected files and useful product features. Products could earn a maximum of 77 points for the detection tests and 76 points for the features tests, for a maximum total of 153 points.

High scorers

The virus scanners that achieved high scores were Dr. Solomon's ToolKit FindVirus, Fridrik Skulason's F-Prot and Leprechaun Software International, Ltd.'s Virus Buster Doctor. Following close behind were McAfee Associates' Scan, Central Point Software, Inc.'s Anti-Virus, RG Software Systems, Inc.'s Vi-Spy and XTree Co.'s ViruSafe.

These products performed consistently well in both areas of the test, earning 80% or more of the total possible test points.

> "Viruses aren't so common that a user who encounters one knows what to do."
>
> ▲▲▲

Other strong performers included Harry Thijssen's HTScan, Symantec Corp. Norton's Anti-Virus and Microcom, Inc.'s Virex-PC. These products garnered between 70% and 80% of total points available.

Testing was done using a simple network configuration: a single workstation connected to a server.

The server, a Compaq Computer Corp. SystemPro with 12M bytes of memory, 840M bytes of hard-disk storage and dual 33-MHz 80486 microprocessors, ran Novell, Inc.'s NetWare Version 3.11 network operating system. The workstation was an 80386 SX PC clone with 8M bytes of memory and a 207M-byte hard-disk drive.

The devices were linked using 16-bit Arcnet cards and an eight-port active hub.

The scanner software was loaded on the server and was run from the local-area network-attached workstation.

For pure detection, the products were judged on their ability to handle a number of virus infection scenarios. Products earned points if they successfully:

- Ran a self-check test to see if the scanner itself was infected;
- Identified common and exotic boot-sector viruses;
- Discovered common and exotic file viruses;
- Uncovered master boot-sector viruses.

The products listed earlier did fairly well in this section of the test. In addition to those, Sophos, Ltd.'s Sweep earned perfect scores in all categories except the self-check test. Sweep was the only program in the test that did not run a self-check for infection.

It should be noted that the self-check test is the only detection test in which McAfee's Scan did not earn a perfect score. The product garnered 10 points out of a possible 11 in that test and perfect scores in all other detection tests. In fact, Scan is so good at identifying infected files, NCSA's Stang notes that if the test focused on the number of viruses a product could detect, Scan would have undoubtedly been a contender for first place.

NCSA also evaluated products based on features deemed useful in helping identify infected files.

One test judged the products on the adequacy of the user interface. "Viruses are not so commonplace that a user who encounters one knows just what to do," Stang said. Points were awarded for suggesting an appropriate course of action and if the scanner provided information about a virus it had identified.

In conjunction with this test, Stang awarded points if the scanner could output messages and information about the viruses to a printer or if it could copy the information to a file. The chart on this page shows how the products compared in the features portion of the test.

Clocking speeds

Another test was designed to see how fast the scanners worked. Each scanner was used to scan a hard disk containing 4,868 files in 148 directories. Of the 147M bytes of files on this drive, about 36M bytes were executable files that potentially contained a virus.

In this test, products earned 10 points if they completed the scan in less than two minutes. One point was deducted for each additional minute or fraction thereof. Several products offered two levels of scanning — a quick scan and a more thorough full scan. In these cases, the times for both scans were averaged.

The test found quite a range of performance. Certus International Corp.'s NOVI and Dr. Solomon's ToolKit FindVirus were the fastest, completing the task in 60 and 84 seconds, respectively. IRIS Software and Computers, Ltd.'s Antivirus-Plus was the only other product that completed the scan in less than two minutes.

Products that were notably slow included Central Point's Anti-Virus, which took more than five hours to complete the thorough scan, although it took less than seven minutes in a fast-scan mode of operation; Leprechaun Software's Virus Buster, which took more than 17 minutes in its thorough scan mode; and Sophos' Sweep, which took about 13 minutes.

Next, Stang tested the products for false alarms: the detection of a virus when none exists. "The problems caused by false alarms are significant and affect users and local support staff," Stang said.

Fourteen of the scanners in this test — in which the products were asked to scan clean files — passed with flying colors. Several products, including Thijssen's HTScan, IBM's VirScan, Microcom, Inc.'s Virex-PC and Central Point's Anti-Virus, detected a few viruses. Central Point's scanner, however, found no viruses when used in its fast scan mode.

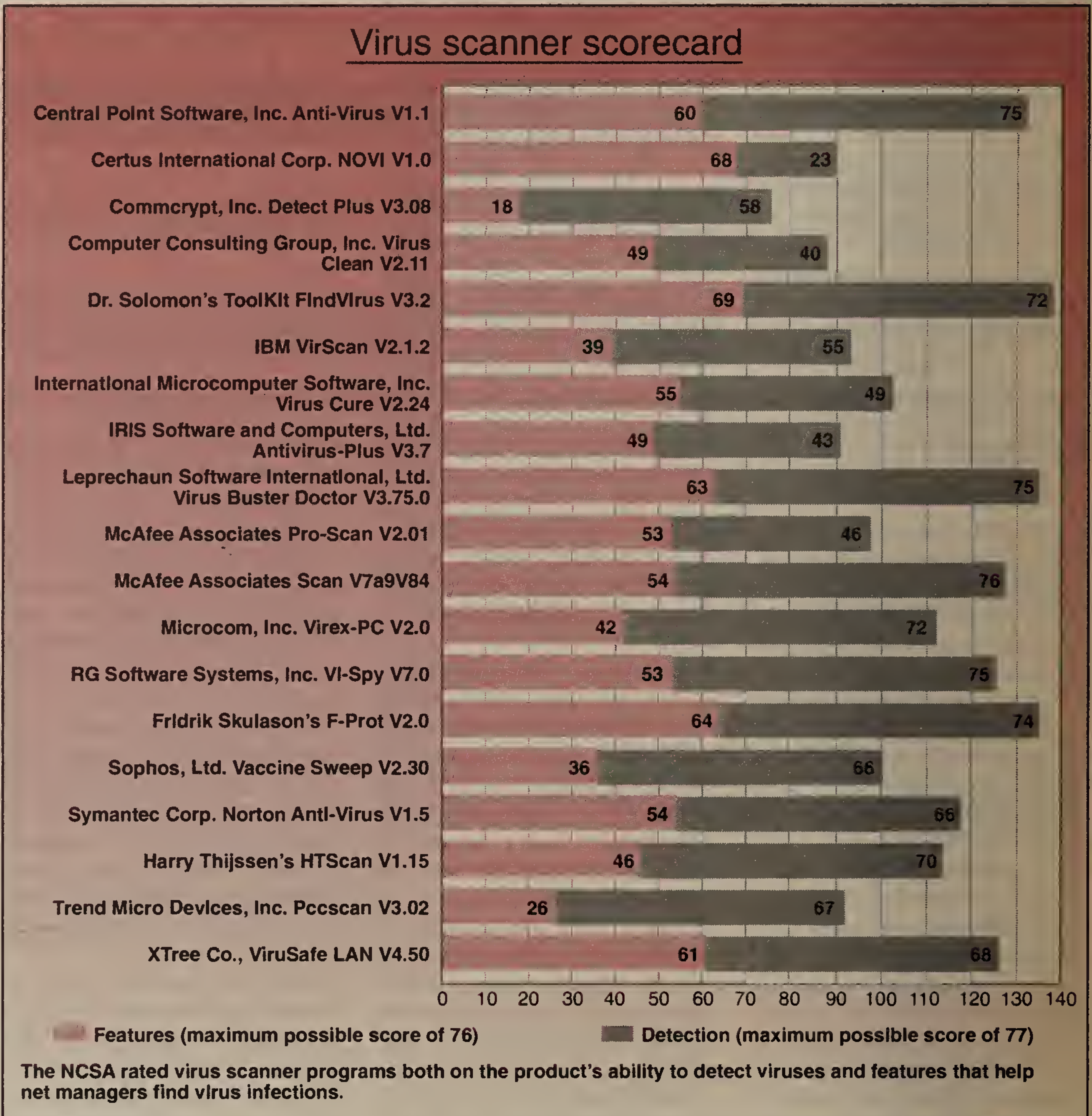
The product that produced the most false alarms was Trend Micro Devices, Inc.'s Pccscan, which reported that it found 53 viruses.

How it adds up

Overall, the results of the testing found that there is a great range in performance among virus scanner tools, meaning users should carefully consider what they need from a scanner and then compare those requirements with the various products' capabilities.

Stang suggests that net managers use these scores as a guide.

"Users should consider the entire package when choosing a virus fighting tool and not focus on just one aspect, such as scanning," Stang said. "Remember that there is more to prevention, detection and removal than just scanning." ◘



The NCSA rated virus scanner programs both on the product's ability to detect viruses and features that help net managers find virus infections.

GRAPHIC BY SUSAN SLATER

SOURCE: NATIONAL COMPUTER SECURITY ASSOCIATION, WASHINGTON, D.C.

This test was conducted by the National Computer Security Association (NCSA) as part of the *Network World*/NCSA Network Security Test Series. The NCSA conducts research on security, virus and data integrity problems, evaluates products and then presents its findings.

A comprehensive report on virus scanner tools, including the results published in this article, as well as additional findings, background information on scanners and a discussion about the criteria used for selecting the viruses used in this test, can be purchased from the NCSA for $75 ($44 for members). The NCSA can be reached at 227 W. Main St., Mechanicsburg, Pa. 17055, or by calling (717) 258-1816 or fax (717) 243-8642. ◘

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